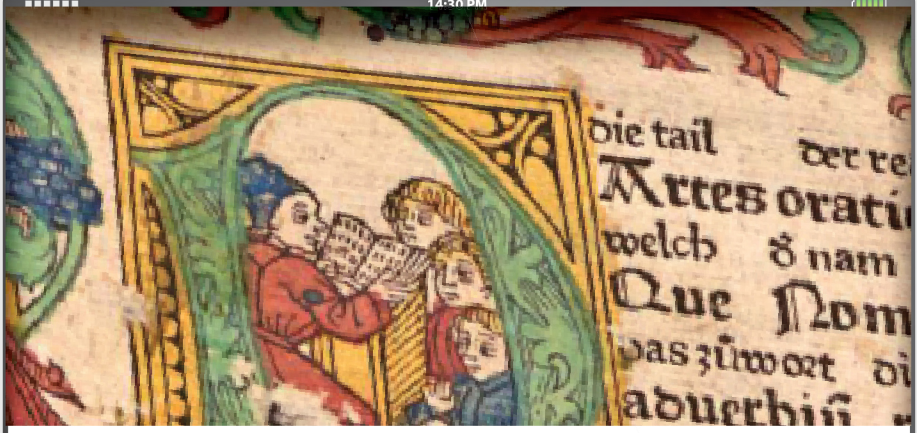
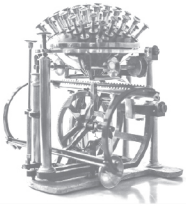


THE TEXTBOOK AND THE LECTURE



EDUCATION IN THE AGE OF NEW MEDIA

NORM FRIESEN

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The Textbook & the Lecture

Education in the Age of New Media

Norm Friesen

Johns Hopkins University Press
Baltimore

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Printed in the United States of America on acid-free paper
9 8 7 6 5 4 3 2 1

Johns Hopkins University Press
2715 North Charles Street
Baltimore, Maryland 21218-4363
www.press.jhu.edu

Library of Congress Cataloging-in-Publication Data
Names: Friesen, Norm, author.
Title: The textbook and the lecture : education in the age of new media / Norm Friesen.
Description: Baltimore, Maryland : Johns Hopkins University Press, 2017. | Series: Tech.edu: a Hopkins series on education and technology | Includes bibliographical references and index.
Identifiers: LCCN 2017012951| ISBN 9781421424330 (hardcover : alk. paper) | ISBN 9781421424347 (electronic) | ISBN 1421424339 (hardcover : alk. paper) | ISBN 1421424347 (electronic)
Subjects: LCSH: Education—Effect of technological innovations on. | Educational technology—Philosophy. | Textbooks. | Lecture method in teaching. | BISAC: EDUCATION / Higher. | TECHNOLOGY & ENGINEERING / History. | LITERARY CRITICISM / General. | EDUCATION / History. | SOCIAL SCIENCE / Media Studies.
Classification: LCC LB1028.3 .F754 2017 | DDC 371.33—dc23
LC record available at https://lccn.loc.gov/2017012951

A catalog record for this book is available from the British Library.

Special discounts are available for bulk purchases of this book. For more information, please contact Special Sales at 410-516-6936 or specialsales@press.jhu.edu.

Johns Hopkins University Press uses environmentally friendly book materials, including recycled text paper that is composed of at least 30 percent post-consumer waste, whenever possible.

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Preface

Education as Technological from the Start

Connecting my work in educational media and technology with a background in the humanities has led me to some startling realizations. One of the most important of these is that the presence of technology in education is not something new. As I show throughout this book, technologies have always been indispensable to education. These range from the tablet to the classroom itself—both of which have been in evidence, in different forms, for millennia. As I demonstrate in chapters 1 and 2, writing tablets have been used for student learning and everyday communication going back more than 4,000 years. The classroom, the idea of a separate and special "space" for instruction, meanwhile, goes back just as far: one finds examples ranging from ancient Sumerian "tablet houses" through religious Torah schools and madrassas to the rooms and hallways of contemporary school buildings.

The precise constituents of the tablet and the classroom have, of course, changed over time. The Sumerians used clay for their tablets, and they used old writing tablets, in turn, to build the walls of their "*edubba'a*" (literally, "tablet houses") for scribal instruction. Today's tablets, made of silicon and plastic, are obviously quite different. Devices for writing have changed—from stylus and clay to stylus and iPad—but writing itself remains indispensable and relatively unchanged over millennia. Indeed, the most basic means of technology for reading and writing, the alphabet, like other writing systems, has changed remarkably little since its emergence almost 3,000 years ago.

Writing and what is written, along with its relationship to speaking and what is spoken, are at the center of this book—the way that speech and writing, these two elemental media, intertwine in the educational forms of the lecture and the textbook. The idea that the history of the lecture and the textbook can tell us something important might at first sound improbable, but I provide a great deal of cultural and historical evidence, ranging from the ancient Middle East

and China, through Reformation and Enlightenment Europe, up to the present day.

At the same time, a different type of evidence also backs up my argument; it can be found in some of the latest hard science. Popular accounts from the fields of neuroscience and evolution show that working with text is not at all something natural to our neurology, but rather it must be arduously "bolted on" to our natural cognitive abilities. For example, in her bestselling *Proust and the Squid*, Maryanne Wolf speculates that "it took our species roughly 2,000 years to make the . . . breakthroughs necessary to learn to read with an alphabet." She adds that "today our children have to reach those same insights about print in roughly 2,000 days."[1] These 2,000 days and the "work" involved in them are for Wolf the equivalent of K–12 schooling. They are what is required, Wolf argues, to carefully adapt the brain to the challenges of decoding text on the screen or page and to effectively encode similar texts with a pen or keyboard.

Wolf and others have described in some detail the difficult and lengthy neurological changes involved in learning to read. They chart the changes and connections that are written on the brain over years of school exercises, over many months spent both composing and reading through progressively more difficult textual material. They also explore the neurological causes of dyslexia and other difficulties in textual literacy acquisition. As Wolf puts it, this effort amounts to a kind of "'natural history' of reading development."[2] It is the story of how parts of the brain are gradually adapted for reading and writing over years of individual development.

By contrast, what I present in this book are the outlines of a different history, a *cultural* history. It focuses on the same tasks and accomplishments, but looks to what happens *outside* of our skulls. It is fine to know the minutiae of our neurological adaptation to the alphabet or other kinds of writing, but what is the history of actually achieving these adaptations, generation after generation? How do we manage the minor miracle of a more-or-less standardized rewiring of the brain, one graduating class after another? How have we inscribed new neuronal pathways and created new mental operations for millions (if not billions) of students over the decades and centuries? Of course, we cannot do this by reaching into the brain to switch and swap neuronal circuitry.

Obviously, this rewiring results from what takes place *outside;* it is achieved only through methods and techniques that have been developed and refined slowly over time. In some cases, we can trace these methods, such as elementary exercises in letter formation or advanced math problem texts, over four or more

millennia. What are among the key components of this indirect or culturally achieved rewiring? Central to these are the most basic and long-lived technologies and techniques discussed above—tablets, styluses, and the contexts purposely set up for their effective and repeated use. Media technologies, from the written alphabet to the hypermedia smartboard, are crucial in education. Also indispensable, I argue, is how the goals of the rewiring of the brain are understood. Reading and writing are culturally configured quite differently in some of the different times and places considered in this book. These begin with the multiple forms and writing systems mastered by the elite Sumerian scribes over two millennia before the Common Era. They also include the rare Latin manuscripts of the early Middle Ages, and, of course, also extend to the posting, clicking, and swiping of today's social media and multimedia users.

These practices, and the days and centuries over which they occur, are clearly not a part of evolutionary or biological time. They instead belong to human cultural and historical time. Despite changes in these technologies over this cultural time span, history shows that in instructional contexts, media use is marked by striking continuities rather than by abrupt changes or successive revolutions. Together, the cases and examples I consider here leave no doubt that the history of laborious interventions into the brain is ultimately a cultural and civilizational one. This cultural and civilizational history has, unfortunately, been largely overlooked. And there is much to be gained by considering it in ways that are both serious and sustained.

In undertaking this serious and sustained examination—one that extends across many disciplinary boundaries—I have benefited greatly from the help of many friends and colleagues. First, I owe a great debt of gratitude to my friends in media theory and communication studies, both in Canada and on the Continent: to Darryl Cressman (Maastricht University) and Edward Hamilton (Capilano University) for their early support and feedback; to Theo Hug (Innsbruck University) and Rainer Leschke (University of Siegen) for introducing me to *Medienwissenschaften* and *Medienpädagogik* in the first place. Their ongoing support for my ventures in these areas over the years has been invaluable.

I have also benefited from the pedagogical insights into media and technology provided by colleagues from the Katholieke Universiteit in Leuven, Belgium, especially Jan Masschelein and Joris Vlieghe, who offered me valuable opportunities for input and feedback on the materials in this book. Similarly, my discussions with Till Heilmann (Bonn), Benjamin Jörissen (Erlangen-Nuremberg), and

Michael Darroch (Windsor) have also been invaluable. I also am grateful for the support of the media ecology community—above all, to Alex Kuskis (Toronto), who has assisted me in a wide range of ways over the years.

I am grateful for the assistance, guidance, and feedback from experts in history, archaeology, linguistics, chemistry, and other fields. These include David Steele (Vancouver), John Davis and Eric Ogle (Bellingham, WA), Niek Veldhuis (Berkeley), and Daniel Tröhler (Luxembourg). Thanks are also due to my Department Chair at Boise State University, Brett Shelton, for his patient support of this project.

Finally, I owe my sincere thanks to those who have provided feedback on various parts and stages of the manuscript: Alan Munro, Beth Wilks, and, last but not least, Nancy Callan.

The Textbook and the Lecture

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PART I / Education and Media, New and Old

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Chapter One

No More Pencils, No More Books?

If you can read this, thank a teacher. —ANONYMOUS

Asking someone who can read to "thank a teacher" is admittedly a bumper-sticker slogan or cliché, but it contains a grain of truth. Mastering reading (and also writing) does not happen spontaneously; it requires a teacher, and often an active parent. It typically happens at a desk and in a school. Focusing and honing these same skills further—reading and writing essays, computer code, equations—continues well into college. In fact, for some, such as writers, editors, researchers, and other professionals, it continues over a lifetime.

Although no one would question the value of reading and writing (or, for that matter, of coding), many do question the value of school and education. Educational institutions are said to be in crisis, to be outmoded, failing, unsustainable. There are plenty of experts and commentators who envision the end of the classroom, the teacher, and also the school itself. Why? The reasons, like those advancing them, come from many quarters. The argument that "schools kill creativity," for example, can be traced back more than 100 years and has been most recently popularized by Sir Ken Robinson, to take just one example. The case that "learning is not the result of instruction [but] rather the result of unhampered participation in a meaningful setting" is made in Ivan Illich's 1971 *Deschooling Society*.[1] These sentiments capture a key viewpoint shared by progressive, collaborative, constructivist, and other approaches to education and learning: that learning in the classroom is the opposite of what it can and should be. Instead of

being fun, natural, authentic, and social, learning is turned into something boring, difficult, artificial, and isolating.

Arguments have also been made from the perspective of science and technology. Given ongoing advances in media technology and neuroscience, the school or university increasingly appears as a kind of "reactionary" or even "feudal" institution, as media theorist Marshall McLuhan remarked more than half a century ago. McLuhan argued further: "The sheer quantity of information conveyed by press-magazines-film-TV-radio far exceeds the quantity of information conveyed by school instruction and texts. This challenge has destroyed the monopoly of the book as a teaching aid and cracked the very walls of the classroom."[2]

There is something definitely exciting about cracked or broken classroom walls, about destroying the monopoly of pencils, books, and teachers. Besides providing lyrics for chants and rock anthems—as fans of Pink Floyd, Alice Cooper, or the Ramones can attest—similar images seem to be mirrored in the arguments of critics and reformers. In an age of social media, twitch speed, and Twitter, it is easy to portray the classroom and blackboard as unnatural, unmodern, unexciting, and uninspiring. These old contexts and forms are all readily seen as outmoded and obsolete—particularly for new generations of "digital native" students. Most of the hallmarks of successive digital generations—from Skype to Snapchat—appear to have no meaningful place in school and are banned from or, at best, ignored in the classroom and lecture hall. These places of education remain zones all but free of new media technology, it seems.

Background: Reform and Resistance

Although critiques and observations of this kind are important, even urgent, they are certainly not new. As the quotes from McLuhan and Illich show, they've been repeated for decades. But echoes of discontent can be traced over the centuries. Author and philosopher Jean-Jacques Rousseau, 250 years ago, roundly condemned formal schooling as unsuitable for children—directing his ire at the then-dominant media technology of the book: "When I thus get rid of children's lessons, I get rid of the chief cause of their sorrows, namely their books. Reading is the curse of childhood, yet it is almost the only occupation you can find for children. . . . I hate books; they only teach us to talk about things we know nothing about."[3]

Rousseau saw children as products of nature, and he considered the rustic simplicity of the countryside to be far superior to desks and libraries. About 125 years

later, around the turn of the twentieth century, John Dewey made a similar argument. His concern, however, was not to return the child to nature, but to take advantage of the communicative potential of new technologies like "the radio, the railway, telephone, [and] telegraph." "The significance attaching to reading and writing, as primary and fundamental instruments of culture, has shrunk proportionately as the immanent intellectual life of society has quickened and multiplied. . . . [Lessons in reading and writing] have become mechanical and formal, and out of relation—when made dominant—to the rest of life."[4]

Technologies for transport and transmission have quickened and multiplied the intellectual life of society, Dewey is saying. Telephone, telegraph, and radio have shrunk enormous distances and can reach vast audiences. This unprecedented change, Dewey concludes, "demands a corresponding educational readjustment."[5] Like Rousseau before, and like Illich or McLuhan later, Dewey wanted to free students from servitude to reading and books. Like Illich, Dewey saw "the only true education" as one that happened in "social situations in which he [the child] finds himself"[6]—situations which generally have little to do with lessons, books, and exercises. Dewey continues by saying that lessons in reading and writing have come to be "regarded as more or less arbitrary tasks which must be submitted to because one is going to that mysterious thing called a school, or else are covered up and sugar-coated with all manner of pretty devices and tricks in order that the child may absorb them unawares . . . we have retained . . . [reading and writing] as the center and core of our course of study."[7]

Dewey is saying, in other words, that given the technological advances of just the nineteenth century, the survival of school with its "more or less arbitrary" lessons remains something of a mystery. Only on the basis of technological advances that today appear rudimentary or old-fashioned, Dewey is arguing that "mechanical and formal" textual work should no longer be "the center and core of our course of study" in schools. Dewey and other reformers would be deeply disappointed by today's classrooms, schools, and universities. They would probably balk at the continued isolation of these places from "the rest of life" and their emphasis on that "curse of childhood"—texts and lessons, reading, and writing.

Of course, Dewey, Rousseau, and McLuhan all offer valuable perspectives and alternatives. Schools and education are naturally far from perfect, and what I've said about these critics is admittedly little better than a retrospective caricature of their positions. (I make up for this with more careful coverage in chapters 3 to 5.) But I'm using them here only to take a first step: to simply get beyond the vicious

circle traced, in various ways and by various generations, in these arguments. This circle begins with education being painted as hopelessly artificial, stifling, and outmoded—arguments that have natural resonance. Next (or simultaneously) demands are made for radical change or even revolution. Ultimately, though, these calls end up having little or no apparent effect. Despite this fact, new reformers and critics soon rise up, along with the newest technologies and the latest findings in physiology and neurology. What finally materializes, however, is not a silver bullet for education, but instead the repetition of a clear pattern: calls for change repeated over decades and centuries that lead to great expectations—and to ultimate disappointments. The same thing is done over and over, in other words, and each time something different is expected for education. There's a familiar diagnosis that can be applied to this pattern, and it's as harsh as it is hackneyed: "Repeating the same mistakes and expecting different results . . . is insanity."[8] If this expression applies, even to the smallest degree, then it is certainly time to try something different.

This is exactly what I do in this book. This text is not an apology for teachers, for existing educational policies, or for the status quo. Nor is it a wholesale denial of the value of reform (an important counterbalance to concentrated, institutionalized power). My starting point and my final aim in this book are both different from this: I begin by reversing the usual impatient responses to the unchanging forms and practices of education. Instead of predicting or calling for the demise of education and its practices, I investigate why such calls and predictions are almost always wrong or unrealized. After decades of repetition—from John Dewey to Ken Robinson—it seems that the question to ask is not when will educational institutions change, but rather why are they so *un*changing? In other words: Why have so many educational forms and practices been around for so long—and why are they still so important today?

In this book I look at the longevity of education and particularly of key educational forms. "Form" in this context refers to the shape and configuration of something, especially as it is composed of individual elements. In examining educational forms, I look at the "old" or most basic media out of which they are constructed, including speech, writing, and print. I also consider how new media or types of mediation—from video and audio media to variations on social media and multimedia—fit in. The specific forms that I investigate are quite different from what are sometimes called "game changers": new or "hot" technologies (like phone and tablet apps today) or buzzwords (like "MOOCs" in 2012[9] or the "flipped classroom" later) that admittedly come and go. Unlike these game

changers, my focus is on the game itself: What are its rules, limits, and possibilities? What is behind its inertia or, at most, its very gradual change? In short, I examine the stability and longevity of actual, persistent settings and methods, rather than hypothetical or desired ones that only might someday occur.

The two specific forms at the center of this book are the lecture and the textbook. These consist of smaller media elements, such as prepared text (the lecturer's notes or textbook text), speech (as articulated either externally or internally), and the act of writing (lecture notes or student notes in the margins). You have no doubt had your own experience with the combination of media elements in lectures and textbooks, just as your parents, and even your grandparents, did before. Some of these experiences were most likely less than outstanding or memorable: time spent in the study hall or lecture hall trying to stay awake; a mumbling, tedious lecturer; or heavy, difficult, and expensive textbooks. On the other hand, some of these experiences may have been positive: a text or class that exposed you to something—a language, a method, a short story, or a poem—that is still with you today.

The long and often surprising histories of these two basic educational forms offer a wealth of fascinating detail. They are not just interesting, however; they are also crucial for understanding education today. They help explain why the textbook and the lecture are still important. The stories of the textbook and the lecture help unlock the secrets of the longevity, power, adaptability, and efficiency of both of these forms and the methods associated with them. It is exactly these secrets that current theories of learning—for example, of learning as information processing or as knowledge construction—often have great difficulty explaining. Cognitivists, who believe the mind works like a computer, and constructivists, who emphasize the construction of mental representations, both see the textbook and the lecture as mere information transmission. They understand reading a textbook or attending a lecture to be actually discouraging deep processing or active knowledge construction. But it is not so simple. A lecture is much more than an information dump, and a textbook is not just inert content. A careful look at their history and evolution offers a very different picture. It also provides essential context for the present and outlines both possibilities and limitations for the future.

Also, a closer look shows that there is significant ongoing interest and innovation in both the lecture and the textbook. Thanks to streaming video online, the lecture appears to have been rediscovered as a key educational form for the MOOC (massive open online course), in the form of TED Talks, and in other

versions of the abbreviated presentation (e.g., five-minute "Ignite" presentations or Khan Academy tutorials[10]). Also, large-enrollment classes and new technologies of "lecture capture" (allowing out-of-class access to recorded presentations) have sparked urgent questions about the lecture: Are students being shortchanged in lectures to classes of hundreds? Why would students come to class if pre-recorded lectures are available online? How can class time be most effectively used—for interactive questions and answers? Questions of this kind are addressed in chapters 8 and 9, which focus on the past, the present, and the possible future of the lecture.

Something similar can be said for the textbook. Dewey dismissed this form long ago as essentially medieval, as "Scholastic—minus the logical accuracy and system of Scholasticism."[11] But there is renewed interest in the textbook as part of a broader transition to e-books. Instead of leaving the centuries-old genre of the textbook behind, many see e-book technologies as offering a range of new possibilities: much greater interactivity, much lower pricing, and many more opportunities for student collaboration. The textbook is discussed in this light in chapter 8.

Media, Change, and the *Longue Durée*

This book makes the case that media and the forms and practices associated with them are all closely connected to education—conceived broadly as "systematic instruction . . . given to . . . a child" (Merriam-Webster). Media shape, mold, or form education, but not in the way usually imagined, expected, and researched. Media, particularly new media technologies, do not simply cause or force changes in education, as is so often suggested in talk of technological "impacts," "tipping points," or "revolutions." Words like these suggest a point when sheer numbers—numbers for cost, efficiency, or popularity—tip the scales and change the game entirely. This could conceivably be the case for any technology that could be identified as a game changer, from the newest display technologies to the latest smartphone app.

As this book shows, the histories of the lecture and the textbook are not marked by convulsive moments of sudden impacts or revolutions. The "acceleration" celebrated in studies of culture, society, and technological innovation is not so easily found in histories of educational technique. When transitions in these histories do occur—and they pop up in surprising ways—they follow the contours of broader and more gradual cultural and social changes. Education is formed less by media "impacts" than through media in the way a river forms

(and is formed by) its banks. These contoured transitions are detectable only over long durations, or as French historians have said, over the *longue durée*. A chief proponent of the study of this type of slow, meandering change is historian Fernand Braudel. The scope and significance of the *longue durée* is exemplified in Braudel's 2,000-page, three-volume history of everyday life in preindustrial Europe, *Civilization and Capitalism*. In a much shorter essay on the *longue durée*, Braudel explains that this historical notion "means becoming used to a slower tempo, which sometimes almost borders on the motionless. . . . For the historian, accepting the *longue durée* entails a readiness to change his style, his attitudes, a whole reversal in his thinking, a whole new way of conceiving of social affairs."[12]

The "whole reversal" in thinking that Braudel calls for here is one that I attempt in this book by directing attention away from what is normally considered most important in technological and educational change—for example, the latest technological buzzwords or the newest school reform policy. These fashions and trends are part of what Braudel calls the very "short time span," a time scale that he says is "proportionate to . . . daily life, to our illusion, to our hasty awareness."[13] Instead of attending to these vicissitudes, I focus on what does *not* change, or rather, on what changes only at the slowest tempo—one that "almost borders on the motionless." These almost-imperceptible changes accumulate only over long periods of time, but as Braudel shows, they gradually add up in unexpected and significant ways.

A relatively simple example of "technology" that is common to all of the eras and contexts considered in this book is the tablet. Of course, tablet computers have been of enormous interest in higher education since their popular introduction to the market by Apple in 2010. The functions of these tablets are many, and the pedagogical possibilities are clearly significant. However, the tablet in a simpler sense has been central to education for much longer, going back to ancient Sumer, around 2500 BCE. There, thousands of clay tablets, some inscribed and "erased" multiple times, were discovered in what is now Iraq. Christine Proust, apparently the only education scholar focusing on this rich evidence, has said these tablets represent the most "well documented . . . educational system of the past"—especially in terms of written student exercises.[14] One example of this kind of work is the finely detailed cuneiform multiplication table that serves as a crucial example later in this book (see chapter 2). This particular tablet is about the size of a deck of cards, complete with a student error.

Variations on the tablet proliferated in later millennia. Figure 1.1 shows the use of a folding wax tablet during the Classical period in ancient Greece. Figure 1.2 shows a medieval variation on the wax tablet with a handle, with a scribe poised to write down the inspired words of his master. In the Middle Ages, tablets of these kinds "were used to make an initial recording of thoughts; only afterwards, would one copy the text onto expensive parchment."[15] The slate tablet, illustrated in figure 1.3, was widely used beginning in the eighteenth century and was commonplace throughout the nineteenth as well. As figure 1.4 shows, a new type of tablet has become commonplace in schools and homes today, and its use is at least in some respects familiar from tablets of previous centuries.

There are certainly many differences separating the material form and nature, the cultural contexts, and the particular uses of tablets through the ages. But one thing that unites them all is that they provide a handheld surface for inscription or writing. Whether this inscriptive function is constituted by touch-sensitive icons and apps or manifest through marks made on wax, clay, or slate, the tablet allows for inscriptive expression (with a stylus or forefinger) without any additional immediate supports or materials. No desk, no inkwell, and no paper supply are needed. Furthermore, the inscriptive tablet interface, regardless of the specific era or technology, can be regarded as a "read–write interface." Clay, wax, slate, and silicon are all favored because they can be wiped clean and reused—in one sense or another. As a result, the tablet can present the user with preexisting content (e.g., inscribed previously by the instructor), with student-generated information that can be refreshed, and with a place for working through alphabetical or numerical inscriptions in fine detail.

From the perspective of the *longue durée*, the story of the tablet as an educational technology or medium is certainly not the story of sudden technological or instructional breakthroughs or of unforgettable disruptions and changes. Instead, over the millennia, what remains important is the act of inscription and reading, and beneath it all, the stable bedrock of written language. David Thorburn and Henry Jenkins explain that ultimately, "The crucial continuity involves not . . . books"—or other specific instances of writing—but written "language itself. Language is migratory across communications media and will endure.[16] Of interest in the *longue durée*, in other words, is not even the history of Apple or of touch interfaces, but the structures, mechanisms, and genres for practicing and utilizing language and, above all, written language. These are deeply rooted in notions of authorship and readership, and in patterns of the creation and circulation of texts, documents, and information that have long histories. And all of

Figure 1.1. Man using wax tablet, c. 500 BCE. Homer's *Iliad* (c. 730 BCE) speaks of King Proteus "scratching many deadly signs on a folded tablet" to seal the fate of an enemy. *Source:* Wikimedia Commons

Figure 1.2. Detail of a scribe with a stylus and tablet with handle, c. 985 CE. The complete image shows Pope Gregory the Great (540–604 CE) dictating revelations relayed to him by a heavenly messenger in the form of a dove. *Source:* Wikimedia Commons

Figure 1.3. Girl with Slate Tablet (c. 1880), by Albert Anker, a Swiss genre painter of the latter half of the nineteenth century. Such tablets were until relatively recently standard equipment for schoolchildren around the world. Wich, *Schiefertafel*. *Source:* Wikimedia Commons

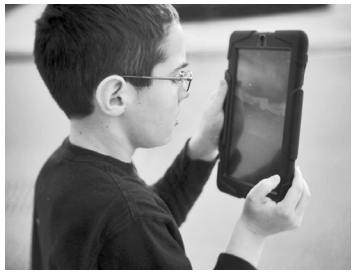

Figure 1.4. A student uses an iPad at school (2012). American primary and secondary schools spent an estimated $9.94 billion in 2014 alone on educational technology, with the iPad having long been "a gadget of choice." Murphy, "Why Some Schools." *Source:* Photo courtesy of Brad Flickinger

these, of course, date back much further than the Internet or computers or, in some cases, even the printing press. It is exactly these broader continuities that I believe are central to education.

As Braudel goes on to explain, these broader stabilities "provide both support and hindrance. As hindrances they stand as limits beyond which man and his experiences cannot go."[17] However, as supports they allow for the widest range of possibilities—just as the tablet itself allows for portability, (relatively) low cost, and easy reuse. Conventions of writing practice—learning to carefully reproduce letter forms or using writing as a means of communication across space (e.g., the postal letter) or across time (e.g., the contract or account)—span millennia and are still all of the utmost relevance today. These conventions likely have their roots in the structures, values, and practices of what is known (at times, controversially) as civilization. A small number of civilizations have arisen over the past 4,000 to 5,000 years, and with these, writing systems and ways of reproducing reading and writing skills have been refined and maintained over the generations.

The point is neither to praise nor to denigrate this type of social organization or its cultural characteristics. The point instead is to recognize how the stabilities that are part of writing, and part of the physical form and arrangements implied by the tablet, do indeed stand as a kind of limit "beyond which [we and our] experiences" do not or cannot go. In this book, I show how the lecture and the textbook, over centuries, have reflected and shaped the way we experience ourselves, our limitations, and our relation to knowledge or truth. Both the textbook and the lecture began and developed as means of preserving knowledge, word-for-word, from its original, sacred, or ancient source. The lecture and the textbook have since been adapted to reflect many changing demands—from the romantic call to self-expression to today's demands for optimal cognitive processing.

Through all of these changes, the power of the written word remains. To apply Braudel's characterization, it can be said to have "persisted despite the fact that all around [it], amid other continuities, a thousand reversals and ruptures totally altered the face of the world."[18] In order to focus on these continuities, and on the supports and practices that are parts of the lecture and the textbook, I introduce and develop a vocabulary that is clearly different from the one associated with technology and its perceived role in education. Terms and phrases like "tipping points" and "impacts," or judgments about "innovators" and "laggards," are much closer to Braudel's "thousand reversals and ruptures" than to the points of stability that outlive them.

Literacy, Culture, and "Remediation" as the Message

In order to highlight continuities in the lecture, the textbook, and related forms, I have chosen to use the term "media" as a keyword. I believe this term can help direct attention toward broad continuity and gradual evolution, rather than focusing on discontinuities, reversals, and ruptures. As should be clear by now, the word "media" doesn't just refer to the mass media, like TV or newspapers. To quote the *Oxford English Dictionary* (*OED*), a medium is an "intermediate agency," an "instrument or channel; a means; especially a means or channel of communication or expression." A textbook, a Twitter tweet, a click of a mouse or tap on a screen, even a whisper at the back of the classroom can all be seen as instances of "mediation." In each of these cases there is a means or a middle term—a medium—through which meaning and significance are created, recorded, edited, and transmitted—whether it be video, audio, text, or simply spoken language itself.[19] In addition to this breadth of possible meanings, the term "medium" brings with it a range of implied meanings that are linked to culture and education and that invite historical reflection. Let me highlight a few.

First and foremost, *media are generally seen as requiring literacies*. As the *OED* says, literacy initially meant simply the ability to "read and write." As it is currently used, however, literacy refers more broadly to the "ability to 'read' a specified subject or medium." The original conception of aptitude in reading and writing is applied, with varying degrees of fit, to categories as diverse as digital media, finance, and culture in the broadest sense. In many of these cases, literacy is associated with teaching and learning. The term "media," in other words, highlights a connection to education, and this connection between education or instruction on the one hand, and media on the other, is central to the chapters that follow.

Second, *media forms give rise to "cultures."* Book culture or gaming culture are subcultures that exist, evolve, and revolve around one or more media forms. Like the media themselves, these cultures are not simply rendered obsolete by a new technology or innovation. "Culture" in this sense refers to values, customs, social behavior, "a way of life or social environment," as the *OED* puts it. Thus, book lovers and book club members share values and behavior like reading, meeting, and talking about novels or nonfiction. Players of online multiplayer games like *World of Warcraft* sometimes inhabit the game world as a full-fledged way of life. They may live in this online social environment and adopt its customs and values with as much (or more) conviction as in any "real world" context. Ways of life

connected with media, from scribal through academic and gaming cultures, are of key importance.

Third, *new media "remediate" old media*.[20] Unlike new technologies, which are generally seen as rendering their predecessors obsolete, new media clearly build on and reuse what has come before. McLuhan once said that "the 'content' of any medium is always another medium. The content of writing is speech," he explains, "just as the written word is the content of print."[21] Print, to extend this line of thought, has provided a good part of the content of the Web (e.g., Amazon .com, Project Gutenberg, Google Books), and the old media of film and TV are now being actively remediated through the help of YouTube, iTunes, and Netflix. Remediation means that the history and combinations of old media are indispensable to understanding media that are new.

As these points about media literacies, media cultures, and remediation show, media have intimate connections to culture, to education, to the content that they (re)mediate, and also to each other. These and other characteristics of media as a category are explored in chapter 6, where I emphasize the importance of media not just in education, but in the general circulation and validation of knowledge. Media—understood as books, newspapers, Websites, podcasts, text messages, and so on—are not simply one way of learning about the world. Instead they are arguably *the* way that we acquire knowledge. From the first moon landing in 1969, through a course syllabus, to the latest Internet meme, what we know and experience in a substantial sense comes to us as pictures and words on pages and movement on screens. What we know, in other words, is almost always already mediated.

But media don't simply provide transparent access to this knowledge. Any information or knowledge is in a sense tinted, distorted, and refracted by the medium through which it passes. As McLuhan famously observed, "The medium is the message."[22] Textual media, for example, force communication into a linear narrative or argument, which lends itself to rereading, archiving, interpretation, and counterargument. Audiovisual media offer a kind of stream of events, suited to personal identification and reaction rather than to analysis and argumentation. In fact, if the medium actually *is* the message, as McLuhan says, this means that media in some sense actually constitute the information or knowledge transmitted. This counterintuitive assertion is explored further in chapter 6.

The third through fifth chapters first look at how different media—and their relationship to information, knowledge, and learning—have been viewed by educators and reformers. These chapters present an in-depth look at Rousseau,

Dewey, and more recent reformers. Regardless of their explicit statements, on a covert or perhaps unconscious level, those speaking of education and knowledge from Plato through to today's instructional and learning specialists tend to see one particular medium as superior to all others: this is either the medium of speech or of writing. The medium they choose becomes the "gold standard" that holds sway—without its status and implications explicitly being recognized.

The seventh chapter looks in more detail at the ideas and theories concerning media that form the methodological and philosophical basis of this book. It provides an introduction to what can be called the philosophy of media. Historical surveys show that before the last half of the twentieth century, media were not discussed in philosophical or theoretical terms. For centuries, when philosophers would turn their attention to language or words, they would theorize as if writing them, speaking them, or broadcasting them were all the same thing. The medium was treated, in effect, as invisible to the message. For example, the French philosopher Jacques Derrida insisted that "we say writing for all that gives rise to an inscription in general, whether it is literal or not." The concept of inscription for Derrida thus includes "choreography, of course, but also pictorial, musical, [and] sculptural 'writing.'"[23] For Derrida, different media, whether visual, audible, or involving movement in time and space, are to be treated (at least on one level) as basically one and the same: as forms of writing unified under the term "arche-writing." And when differences between media actually do arise as philosophical questions, they tend to be dealt with in a contradictory and unreflectively emotional way. A good example is Rousseau's intense hatred of books and writing—expressed paradoxically in writing in one of his many books. This long-held habit has been changing, however, with new approaches to media that have been developing from the 1960s to the present.

Chapters 7 through 9 present case studies of the textbook and the lecture that are at the heart of this book. The textbook is analyzed in chapter 7 in terms of the practices, uses, and interactions that it facilitates. Although the term "interaction" is generally reserved for engagement with computers or sophisticated digital technologies, I show how textbooks have long been used to script teaching and learning activities in ways not unlike well-designed instructional software. This began with the (medieval and, later, Protestant) catechism, which orchestrated not just narrowly religious, but also broadly secular pedagogical practices of call-and-response. Later, books that prompted individual self-examination and inductive questions and answers achieved widespread popularity, and variations on these prompts and questions are still common today. Chapter 8 examines the

history of the lecture, focusing on a particular turning point at the end of the eighteenth century, when lecturers started speaking their own thoughts and ideas, rather than reciting or commenting on texts that had come before. This development gradually led to the modern university classroom lecture, whose variations and permutations today are the subject of chapter 9. The concluding chapter, finally, goes back to debates that have been ongoing about writing, literacy, and education, and sheds new light on these issues through its own findings on the lecture and the textbook.

I bring this introductory chapter to an end, however, by revisiting the quotation with which I began: "If you can read this, thank a teacher." My point in starting off with this quote is that it highlights the medium that is far and away the most important for the culture of education—namely, text. Like any other medium, text reflects, refracts, and embodies knowledge and information in particular ways. Careful consideration of the particular culture and practice of textual media, and the type of literacy associated with them, goes a long way to answering the question that lies at the heart of this book: "Why are so many age-old educational forms—especially the textbook and the lecture—still so important today?"

Chapter Two

Writing Instruction in the Twenty-First Century

2000 BCE versus 2000 CE

> The history of education is the history of writing.
>
> —KEITH HOSKIN, 1981

In the previous chapter, I emphasized the centrality of writing to education and schooling. Writing and textual media generally have a special relationship to matters academic, and, if Hoskin is correct, writing and education also share a history. However, to understand the history of education as the history of writing, it is important go back to the beginning—or at least as close as we can get. Writing as a medium or technique for recording events is a prerequisite for history: the beginning of writing in this sense is the vanishing point of history. But can something similar be said for education? Is this vanishing point also where education emerges? My answer to these questions in this chapter is a clear yes.

Specialists in language and writing have identified only a handful of points for the beginning of writing, all dating from well before the Common Era (CE). Writing, we are told, was "invented from scratch at least three times: in Mesopotamia, in China, and in Mesoamerica."[1] With each of these inventions also arose empires stretching across tens of thousands of square miles, as well as elaborate written cultures, each with their own written histories, laws, and literatures. Only in Mesoamerica were these accomplishments effectively erased, and only through the most brutal of cultural genocides. Otherwise, the earliest instances of the invention of writing live on today in numerous derivatives. Ancient Chinese writing, for example, survives in Japanese and of course in modern (simplified) Chinese. Almost all writing systems east of the Himalayas, from Burma through the Arab world, and even our own phonetic alphabet, derive from a

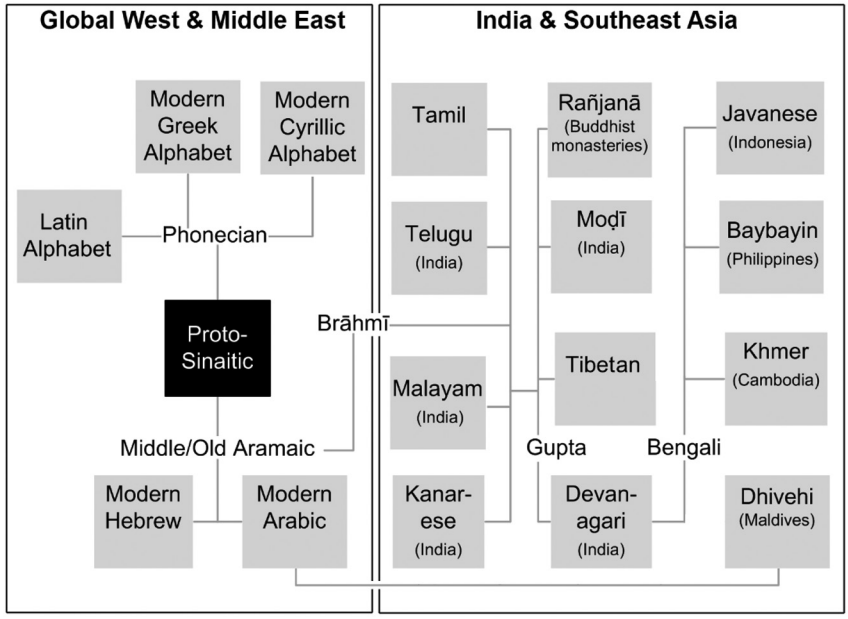

Figure 2.1. Examples of writing systems in use today derived from Proto-Sinaitic. These systems, now dominant in the Americas, Africa, Eurasia, and the Indian subcontinent, are in gray boxes; obsolete, "transitional" writing forms interconnect these. *Source:* Adapted from Haarmann, *Geschichte der Schrift*

single Proto-Sinaitic script (figure 2.1), which itself is often thought to be Mesopotamian in origin. Other writing systems, from the Cherokee syllabary to Korean Hangul, can be traced back to exposure to a derivative of one of these types of writing—or at the very least to contact with textual forms and functions. Writing, in short, is an innovation that is as difficult to invent as it is viral and tenacious.

All known societies have spoken one or more languages; historically only some of these groups have also produced writing, and only a few, of course, have invented it entirely anew, *ex nihilo*. Our ability for speech is seen as part of our genetic endowment. However, reading and writing are quite literally not "in our DNA." Cognitive psychologists and neuroscientists like Steven Pinker, Diane McGuiness, and Maryanne Wolf have been telling us that when it comes to the three "Rs"—symbolic abilities in reading, writing and 'rithmetic—thinking in terms of natural neurological activity or evolution is not enough. Instead, they

emphasize that reading is not something easily learned, like walking, talking, or playing a game. Steven Pinker has put this more simply: "Children are wired for sound, but print is an optional accessory that must be painstakingly bolted on." He adds, "Writing systems have been invented a small number of times in history. They originated only in a few complex civilizations. . . . Until recently, most children never learned to read or write; even with today's universal education, many children struggle and fail. A group of children is no more likely to invent an alphabet than it is to invent the internal combustion engine."[2] Writing systems and their use generally have to be learned through systematic—and at times arduous—instruction and effort. A deliberate investment goes into ensuring that reading and writing are preserved from one generation to the next.

One of the first societies (if not *the* first) to use a multipurpose system of writing arose over 4,000 years ago in what is now central Iraq: Sumeria in Mesopotamia. Their use of the cuneiform writing system—for diverse trade, administrative, and religious purposes—peaked around the second millennium BCE. As discussed in chapter 1 in connection with the tablet, archaeological research has recently revealed much about the way this writing was practiced and preserved across generations. This is a fascinating story with many significant implications, but the story has been almost entirely ignored in educational research. From the way Sumerian writing was taught and learned for centuries, I believe it is possible to understand a number of important dimensions of teaching and learning and their connection to media, especially textual media, in our own time. Consequently, in this chapter, I look at the histories of writing and education some 21 centuries before the Common Era; in doing so, I hope to shed light on learning in this, our own twenty-first century. I show that there are many significant, even striking, continuities connecting inscriptive instruction, tools, and practices across the millennia.

Twenty-First-Century (BCE) Learning in the Fertile Crescent

As its name suggests, the ancient civilizations of the Fertile Crescent were based on agriculture. Cultivation, irrigation, and animal husbandry were all important occupations. These were accompanied by a wide range of other activities, from weaving to coppersmithing and masonry. As in many other eras and societies, these practices or trades did not require any explicit schooling or formal education. What we today call trades were learned through apprenticeship or on-the-job training, through observation and participation, with such workplace learning starting at a relatively young age. Apprenticeships of these kinds used a

type of instruction that today we would recognize as situated, interactive, and practical in nature. Reading and writing were taught and learned in ways that were very different, however.

The ancient Babylonian economy paid a high price to maintain scribal skills and abilities. Today, education systems cost somewhere between 10 and 20 cents of every dollar of government spending around the globe. In ancient Sumeria, children (mostly boys) were removed from the world of agricultural or other forms of productive labor for a number of years to learn how to read and write.[3] They were sent off by their parents to special places—generally one or two rooms in a private house, removed from the noise of the marketplace and the dirt of the field or pasture—where they were overseen by one or more scribal masters. In these secluded locales, writing implements (a sharp stylus and, later, reeds), examples (texts and lists), and also material (clay) were available in abundance. In some cases, the walls of these rooms were covered with cuneiform tablets, which were also reused as building materials. Thus the houses came to be known as *edubba'a*, or "tablet houses." Those who attended them were called their sons.

Writing was inscribed on clay tablets with triangular or *cunei* (Latin for "triangle") forms made with a blunt reed, stylus, or *calame*. The character set constructed from these forms consisted of about 600 symbols: some 40 phonetic characters (consonants and vowels) were combined with a few hundred symbols indicating syllabic combinations. (This would be like having separate letters for "uch," "ick," or "ing.") The result, over time, was two sets of characters known as syllabaries A and B. This type of writing was used largely for accounting, trade, and administrative purposes. It was also used to preserve practical information over space and time: contracts and records for land and grain were written on clay tablets and sealed in clay envelopes. Also, writing was closely associated with the priesthood in this early society. Figure 2.2, for example, shows a message sent by a high priest to the king of Lagash in around 2400 BCE to inform him of his son's death in battle.

Writing was not only associated with a specific scribal class or specialization; it was also associated with a specific written cultural or literary heritage—one encompassing myths about gods and their adventures, and hymns of praise to kings and temples. The Code of Hammurabi, regarded as a forerunner of the Ten Commandments, was written and disseminated in cuneiform. So was the story of the demigod Gilgamesh, one of the earliest recorded epic poems. Tens of thousands of clay tablets with cuneiform writing survive today; the hot desert sun

Figure 2.2. A message sent by a high priest to the king of Lagash in around 2400 BCE to inform him of his son's death in battle. *Source:* Wikimedia Commons

and the fires set by marauding armies have only served to preserve and harden them. Indeed, Christine Proust, who has researched mathematics education in ancient Sumer, goes so far as to say, "No other educational system of the past is as well documented as that of Mesopotamia. . . . [And] it is mainly the production of students that has been preserved [in the form of] clay tablets written by young students during the first stage of their education (or "elementary level"). . . . These tablets were discovered in many archaeological sites, over a large geographical area, including present-day Iraq, Iran, and Syria. On these tablets, young scribes wrote out exercises for learning cuneiform writing, Sumerian vocabulary, and grammar, numbers, measures, and calculations."[4] It is from these documents, particularly the ones discovered and analyzed in recent decades, that we can now understand a great deal about the "cuneiform culture" of education that flourished millennia ago.

This 1903 description of an *edubba'a* by one of its earliest discoverers, archaeologist Hermann Hilprecht, is a good starting point:

> The character of the northeast wing as a combined library and school[5] was determined immediately after an examination of the contents of the unearthed tablets and fragments. There is a large number of rudely fashioned specimens inscribed in such a naive and clumsy manner with old-Babylonian characters that it seems impossible to regard them as anything else but the first awkward

> attempts at writing by unskilled hands,—so-called school exercises. Those who attended a class . . . receiv[ed] instruction not only in inscribing and reading cuneiform tablets, but also in shaping them properly, for not a few of the round and rectangular tablets were uninscribed.[6]

Others have since confirmed Hilprecht's initial deductions: he had uncovered a set of exercises of young scribes, exercises that, as both Proust and Hilprecht indicate, began with methods of refining motor skills needed for accurate, legible inscription. We now know that this exercise involved the use of special oversized tablets—perhaps comparable to wide-lined paper today—to accommodate large letter forms and less-precise motor control. In some cases, scribal instructors

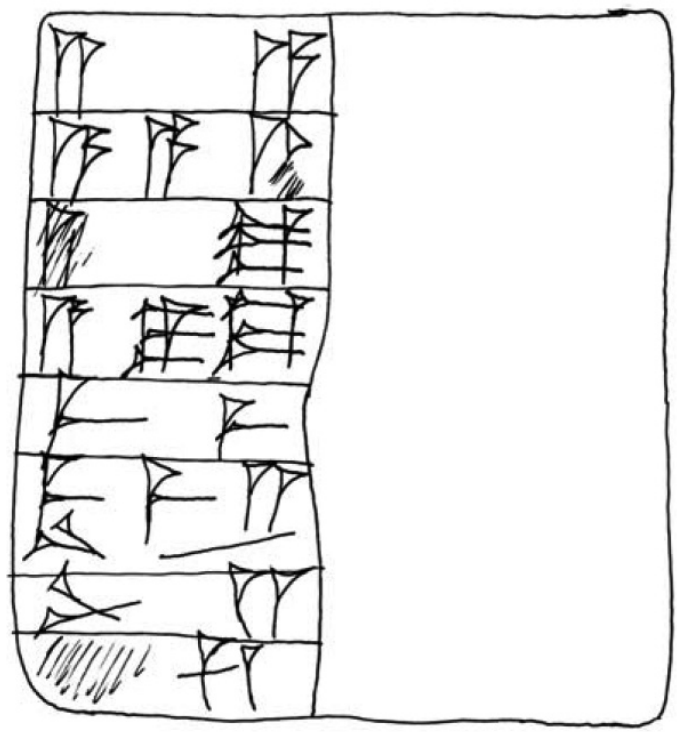

Figure 2.3. "Teacher's model with the beginning of a traditional list of signs and sign combinations, to be copied to the right by a pupil" (3 × 3.5 in.). Veldhuis, "Cuneiform," 16. Signs written on a large tablet allow the novice to exercise every detail of the sign. *Source:* Image used with permission from Veldhuis, "Elementary Education"

would render their own examples on these special tablets for the beginning learner to copy, as illustrated in figure 2.3.

The study of these and other primitive student exercises continues today among Assyriologists, who are gradually piecing together more and more about the ways that inscriptive abilities were passed on from one generation to the next. For example, researchers have uncovered patterns in elementary scribal exercises that suggest the use of the technique of dictation or recitation. This pattern is indicated by cuneiform tablets that are otherwise identical except for varying spellings of words that sound alike. This evidence points, they believe, to the practice of an instructor scribe dictating words while novice scribes record them separately on their tablets.[7] This method is still used today in everyday instruction in reading, writing, and foreign languages, and it has a rich history in the West and in many other cultures (see chapters 8 and 9). This same evidence also suggests that there was a single instructor facing and working with multiple learners in a common activity, rather than one-to-one or other instructional arrangements. It implies, in other words, a kind of "frontal instruction": the familiar (and often-lamented) scenario of a "sage on the stage," holding forth before a captive younger audience.

Another telling artifact (figure 2.4) is a multiplication list or table in cuneiform on a tablet that is notably smaller than that in figure 2.3. This artifact illustrates a clear shift in instructional emphasis from rudimentary motor skills to finer work on quite a small scale, and a move from mere copying to much more abstract abilities. The task here would presumably be to combine mathematical reasoning with memorized knowledge of mathematical relations—in the way that multiplication tables are still learned and completed today. Using a base-60 numerical system, the calculations on this tablet run the equivalent of 40×1 to 40×19, including a notable mathematical error (which could be rendered as $40 \times 14 = 550$).

The elaborate ordering of symbols in this artifact implies a high level of abstract cognitive focus and analytical coordination. First, the table has no situated task or "real-life" context as a self-evident point of reference. The significance of the figure 40, or of the utility of the statement that "$40 \times 14 = 560$," after all, is not about any one situation or context. The fact that it is hypothetically relevant to the widest range of 560 instances of things is precisely what makes a multiplication table worth learning and writing down. As is the case today, the value of multiplication products must be carefully rehearsed in writing, and with varying degrees of effectiveness or accuracy.

Figure 2.4. Clay multiplication table inscribed with cuneiform, Babylonia (Iraq), second millennium BCE. This item and its interpretation are available at the Israel Museum, Jerusalem. *Source:* Photo by author

Sequenced Instruction: The Nippur Curriculum

The examples of the multiplication table (figure 2.4), as well as the exercise in letter forms and combinations (figure 2.3), might seem simple, even mundane. However, these examples are just two of many thousands of tablets or exercises found throughout ancient Mesopotamia. Assyriologists have photographed, catalogued, and studied this voluminous evidence, and have identified clear patterns and regularities in terms of both the content and the location of these tablets. For example, they have discovered that an extended progression or sequence of instruction was commonly utilized in certain parts of Mesopotamia between

2000 and 1000 BCE. Because it is most richly documented in a city known as Nippur, this sequence has been called the "Nippur Curriculum." According to Christine Proust, this curriculum unfolds in three general phases: "In the first phase students concentrated on learning how to write the basic wedges that comprise cuneiform script . . . a vertical, horizontal, and diagonal wedge . . . repeated; the sign A repeated; the list of Akkadian symbols now called Syllabary A . . . a similar text known as Syllabary B . . . [and finally,] a list of deities."[8] Parts of characters and the characters themselves are the first objects of attention in this instructional sequence. Proust continues by explaining that the two phases following on this initial stage concentrate on the inscription of words of increasing complexity:

> Short or long extracts from . . . exercises . . . were written out on large, square, multicolumn tablets, often combined with brief passages from *ad hoc* and "non-canonical" lists. . . . [These included] metrology [weights and measures], personal names, place names, professional designations, lexical lists—and/or literary works, proverbs, and administrative formulae, optionally with a colophon [for bibliographical information] in the final column. In the second phase long, single-column tablets were preferred, with dates of writing replacing colophons. Students continued to copy syllabaries . . . plus short excerpts from incantations, hymns, literary works, and more complex lexical lists, with up to four different compositions on a single tablet.[9]

Thus, scribal instruction in Sumer followed a systematic, even standardized progression, and this progression reflects different configurations of writing materials, exercise content, and instructional methods. Writing materials shift from large, square multicolumn tablets to longer and much smaller single-column tablets. Exercise content begins with characters (and their parts), moves through words to sentences, and then to brief excerpts from canonical texts. Instructional methods, finally, appear to transition from the reproduction of instructor examples to the inscription of oral recitations. Moreover, each sequential, inscriptive, or instructional combination is a prerequisite for the knowledge and skills that developed in the next. The inscription of characters is obviously needed to copy words, and words are needed to construct sentences. Basic motor skills are of course the prerequisite for much finer, small-scale inscriptive work—just as deep familiarity with characters and words is directly required to record instructor dictation.

One can further observe that breaking down scribal ability into these separate tasks and materials requires particular kinds of dissection, separation, categorization, and sequencing. Insofar as it is sequenced for the sake of learning, rather than any other purpose, this path and the arrangements and methods it requires can be seen as explicitly instructional. From the perspective of the practical concerns of everyday life, any one task on its own would likely seem unnatural or alien. But together they are designed to take the learner from novice to expert. And as I explain later, this separation, reassembly, and sequencing is among the most common and taken-for-granted of pedagogical forms and arrangements today. Table 2.1 lists the writing exercises from the Nippur Curriculum and outlines the progression of steps described here in greater detail.

In still more advanced stages of scribal instruction than those discussed above, learners studied a broad range of texts, including:

Table 2.1 The Nippur Curriculum

Sign exercises	
Sign elements	Tablets filled with horizontal, vertical, and oblique wedges
Syllabary B	Standardized sign exercise, introducing the most important signs with lots of repetition
Tu-Ta-Ti	Sign list; triads of signs with alternating vowels (u-a-i); used by some Nippur teachers
Thematic lists	
Lists of names	Various lists of Sumerian and Akkadian names
Sumerian nouns and nominal phrases	Trees and wooden objects, reeds and reed objects, ceramics, hides and leather objects, metals and metal objects, animals, meat cuts, stones, plants, etc.
Advanced lists	
Acrographic lists	Lists of Sumerian words ordered by first sign
Advanced sign lists (compound signs)	Lists of signs with all possible readings (even very rare ones); list of special sign combinations
Numerical exercises	
Metrological lists and tables	Weights, lengths, volume, etc., in standardized format
Mathematical tables	Multiplication tables and reciprocal tables
Phrases and sentences	
Sumerian proverbs	Multiple collections, using rare words and sign values acquired in earlier exercises
Model contracts	Realistic contracts, without witnesses or dates

Source: Simplified from Veldhuis, "Levels of Literacy," 83

> myths; narratives of kings from a heroic age; praises of kings; lamentations over the destruction of cities; hymns to gods and temples. . . . There is evidence of attempts at pedagogical systematization of this wealth of literature, in the form of several catalogues giving the first lines of texts. Two other catalogues seem to be comprehensive listings of the corpus of Sumerian literature; they not only show extensive similarities despite probably being from different sites, but also appear to show evidence of a pedagogical ordering of the compositions, at the very least at the beginning of the catalogues.[10]

This account of an advanced curriculum points to at least two further important characteristics of writing instruction. First, the fact that there are extensive similarities in instructional catalogues that are independent of location suggests the importance of standardization in writing instruction. If it is to communicate across both the vast space of an empire and the timeframe of multiple generations, writing must be as free as possible from idiosyncrasies and regional variations in learned form and technique. Second, the description refers to materials characterized by "pedagogical systematization"—presumably to ease novice access, recognition, or remembrance. These and other didactical forms and arrangements, such as teacher examples, tablet sizes, and content sequences, can be seen to be purpose-built for learning and instruction.

What are other ways that activities, forms, and material might be arranged and systematized so that we can call it pedagogical? One example is provided by mathematical, geometric, and other problem-questions that have also been of interest to Assyriologists. Like math word problems today (e.g., having five apples and then adding two more), these texts or tablets provide artificial problems and sometimes also include their answers:

> Some tablets contain only one example, which gives all the details of the solution of the problem stated at the beginning of the text. . . . At the other extreme are tablets which state hundreds of problems in a very condensed form but give no answers, and texts which represent a smaller collection of coordinated problems. [. . . Other] texts are systematic compendia of exercises arranged according to a consistent scheme. The common principle . . . to solve all these problems is similar to our use of an algebraic formula in which we are allowed to substitute special values for the letters *a, b, c* etc. which occur as coefficients.[11]

The intent of these sometimes-sophisticated problem-questions (and their solutions) is not simply to have the one right answer. Instead, it is almost certainly to

encourage the learner to learn ways of interpreting, framing, and understanding complex problems, and to inculcate mathematical abstractions through matters that are much more tangible and concrete. Like many activities and abilities listed in the Nippur Curriculum generally, the pedagogical form of the problem text has a readily recognizable application in the context of teaching and learning.

The historical record from ancient Sumer, to conclude, provides us with tens of thousands of tablets of lapidary evidence, confirmation that is literally written in stone. This massive data set highlights a great deal about one point in time in the history of writing and the history of education. Although aspects of this systematic instruction arose independently of education today, many of those aspects are still readily recognizable:

- The removal of the young from the everyday world of productive labor and practical activity to a sequestered space
- The provision of specialized writing material and equipment in this location
- The use of this space for activities that are visibly different from practical apprenticeship and profit-making activity
- The generation of products (tablets, written exercises) that may have significance for the learner's development but that have no other obvious value
- The development of skills in symbolic communication and reasoning that are standardized—recognizable across the reaches of space and time
- Instruction that is varied and sequenced, and that likely includes frontal instruction, dictation, copying exercises, and other recognizable forms

All of these similarities suggest that the instructional arrangements and practices in ancient Sumer did not arise by chance. Instead, it seems that such arrangements and practices have an efficacy and mutual-reinforcing interdependency all their own. Moreover, their value and interconnection have a single specific purpose: to preserve, reproduce, and expand inscriptive and symbolic abilities from one generation to the next. But beyond the most obvious similarities, how does this twenty-first-century (BCE) writing instruction compare with our own twenty-first-century (CE) circumstances?

Twenty-First-Century (CE) Learning in the Global West

As in Nippur some 40 centuries earlier, children today—from Nairobi to New York—still learn writing through a set of steps with carefully sequenced arrangements of instructional methods, materials, and content. For example, writing lessons in alphabetic script today start with children drawing oversized signs and their subcomponents: lines, circles, and curved marks. The shapes and their sounds are recalled through simple mnemonic tricks: "S" is for "snake," long and curved. "Q" is for quarter, big and round. Certain letters are written together in special exercises with other letters similar in appearance (e.g., b and h), in order to practice similar shapes and combinations. As one recent article describes, teachers may begin "first of all [with uppercase] letters using straight lines (e.g., L, T, H), then letters using curved lines (e.g., C, O, U), and finally those using oblique lines (e.g., K, N, M)."[12] Lowercase letters soon follow, with careful attention to the types of shapes combined in these characters. Thinking of such a list of arbitrary steps, strokes, and shapes in instruction today—and of their equivalents in Sumerian training—one might be reminded of the young John Dewey's complaint in chapter 1: the "more or less arbitrary tasks" that are inevitably undertaken at "that mysterious thing called a school"—tasks that "are covered up and sugar-coated"—are perhaps not so entirely "arbitrary" and "mysterious," after all. Instead, it appears that these tasks are utilized out of necessity in what might be one of the more difficult phases in sequenced writing instruction—whether ancient or modern.

Finally, "lists of signs" and "names" have also long been important, as one classic manual, *Handwriting Instruction in Elementary Schools,* explains:

> Early [student] writing may be centered about instances as the following[:]
> 1. Their names
> 2. Telephone numbers, dates
> 3. Labels and captions for charts and pictures
> 4. Calendars
> 5. Records, such as temperature charts or records
>
> As the children develop in handwriting skill, the teacher enlarges his role to facilitate further growth in helping pupils write their own announcements, notices to be sent home, or simple stories.[13]

This is one area, however, where twenty-first-century instructional practices are noticeably different from those four millennia ago. Instead of focusing exclusively on alphabetical lists of names or specific letter combinations, children today are

encouraged to develop their skills further for purposes that are more individualized and immediate, such as labels and captions for charts, pictures, calendars, and dates. As I show later, it takes millennia for writing to be seen as something more than merely a skill for copyists and scriveners, or for the reproduction of preexisting canonical text and forms.

Of course, some of the broader social circumstances of learning to read and write in the twenty-first century (CE) also differ clearly from those of ancient Sumer. Advanced textual skills based on recitation and calculation are no longer the privilege of a specialized scribal class. Those who can read and write are not considered the equivalent of priests, nor are the texts they read generally seen as constituting a canon of religious or mythological significance. Schooling today takes place on a mass or universal scale, not just for a small number of males from privileged families who could afford to do without the fruits of their manual labor. Today relatively advanced and standardized textual abilities or literacy are seen as nothing less than a universal and fundamental human right. Common instructional forms and practices, reminiscent of their Sumerian forebears, have spread across the globe, as literacy researcher David Barton describes: "When children write in school they produce writing in special books. . . . they are a certain size of paper different from the paper of personal letters or business life. Children are often restricted in the sort of writing instrument they may use. . . . In many countries low quality crayons are used by young children learning to write. . . . What happens to the work is not clear, often it is taken home, and may be thrown away, or kept for many years."[14]

Of course, we know that some of the products of early writing instruction in ancient Sumer thankfully met a different fate than what Barton describes. At the same time, Sumerian tablets and the work produced by children during that period are not the only records of writing (and reading) instruction available to us today. There are many others, and two examples form the basis for the concluding part of this chapter.

History, Education, and Writing

The parallels between the basics of Sumerian education in 2000 BCE and our own twenty-first-century practices are hardly flukes or exceptions. I conclude this chapter by briefly considering two historical examples of reading and writing education that provide still further evidence of continuity. Unlike ancient Sumer, these examples are slightly more recent—arising *since* 2000 BCE, namely: early Jewish education in Hebraic and Chinese education, in their own logographic

writing. Both of these examples highlight the importance of many of the arrangements and practices outlined earlier. At the same time, they show how these factors are shaped by the character and culture of the given writing system itself.

One study, *History of Jewish Education from 515 BCE to 220 CE*, traces the ways children were taught the Hebraic alphabet as it emerged in the final centuries before the Common Era. Like our own alphabet, this writing system is derivative of Proto-Sinaitic and has about two dozen characters. One historian asks: "How were the children taught to read? At first the teacher would write several letters of the alphabet on a [wax] tablet and have the child identify each one by name. In order to be certain that the child could easily recognize them, the teacher at times reversed their order . . . [and s]ince Hebrew has no vowels and the vowel signs had not as yet been developed, reading was not an easy task."[15]

Significantly, this reading and writing instruction was almost always held in the local synagogue. And it was not about developing reading as a skill (i.e., "literacy") transferable from any one text or task to another. "Reading in those times" meant exclusively "the reading of a special book—the only book available, the [Hebrew] Bible."[16] So literacy, or reading, in early Hebraic was about reading and also writing a single holy text (we will find a similar situation in the age of the Reformation; see chapter 8). Since the Hebraic alphabet at this time used only consonants (i.e., sd nl cnsnnts), the reader was effectively required to *know* the text before reading or deciphering it. As a result, Bible verses that were committed to memory were at the same time those texts best suited for a beginning reader to decipher.

A further challenge for education in this context was presented by the use of "books" themselves. Books around this time took the form of prohibitively expensive scrolls, which are still the canonical form for sacred scripture in synagogues. The first five books of the Hebrew Bible (the Jewish Torah or Christian Pentateuch) were seen as *the* paradigmatic texts. They were "invested with such sanctity, and the manner of writing [them] . . . was surrounded with such restrictions, that there was no question of a boy attempting to do it."[17] No student could write out one or more of these books either in part or in whole simply for himself, and possessing even a part of one of them was also forbidden. Dictation of these texts or any others for the purpose of creating copies was strictly forbidden by religious authorities. There were even prohibitions against the sale and purchase of the Torah and other scrolls. The only way around these restrictions, as one historian explains, was for a teacher to "write out only a portion of a

book" of the Hebrew Bible for himself, with the presumed intention "to complete it at another time."[18] Such supposedly "temporary" fragments were then used to form small scrolls for study by schoolchildren.

The Chinese writing system dates back much further than either the Latin or Hebrew systems—all the way to the second millennium BCE. The Chinese logographic system is neither an alphabet nor a syllabary, both of which represent meaning through short units of sound. Each of the many thousands of Chinese characters instead represents an individual word. Although these characters can be combined to form still more, learning to read is largely a matter of learning whole words. Chinese characters sometimes provide information about pronunciation, and some also signify through their resemblance to corresponding things, actions, or qualities. (For example, the same character that represents "within," "while," and "middle," and also "China" and "Chinese"—China being the "middle country"—is a box bisected with a vertical line). The many thousands of characters have an undeniable effect on education—particularly on the earliest levels. Each grade in the Chinese school system represents a step in the gradual accumulation of a written vocabulary that may eventually reach over 4,000 words.[19] Although there are underlying patterns in some Chinese characters—for example, "radicals" that are sometimes used to group related words together in dictionaries—memorization and recitation of characters and passages are indispensable in learning to read, as one contemporary source emphasizes: "No matter what pedagogical tricks experienced teachers can play—by meaning-expressing radicals, by sound-expressing components or by association, with flash cards, low-tech writing brushes to motivate interest, or a high-tech IT platform to woo the attention of younger learners—the amount of time that can be given in any program is much less than needed to master this basic set of characters, let alone the combination of individual characters in this basic set to form a much greater number of words and phrases."[20]

Teachers of Chinese writing, like those working with other languages, must resort to special ruses, tools, and techniques in an effort to deal with the arduousness of their instructional task. One of these special tools and techniques in Chinese is actually a kind of poem, a primer for beginning readers that dates from 600 CE and has been used for hundreds of years since. Known as the *Qiānzìwén*, or the *Thousand Character Classic* (figure 2.5), this text "aims at teaching a maximum of characters in a minimum of text." It organizes "a list of 1000 characters" without repeating a single one, and breaks them down into 250 lines of four characters each, ordering them into a coherent and rhymed form. The

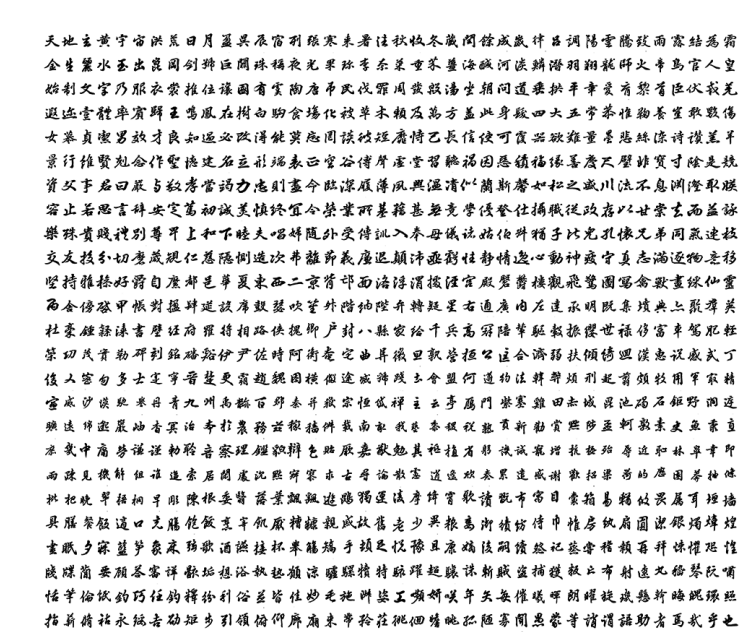

Figure 2.5. The Complete *Thousand Character Classic* (40 × 25 characters). This text (usually with symbols in groups of four) was read and recited for centuries as an aid to learning the most common Chinese characters. *Source:* zcool.com.cn

poem begins with a description of the heavens and earth, and ends by praising Chinese inventions in hunting, writing, and paper. This 1,000-character text can be sung or recited, making learning of these crucial first 1,000 characters both "easier and more interesting."[21]

To conclude, the history and culture of education between civilizations and across time appears indeed to be the story of writing, as Hoskin wrote. Accounts of Sumerian, Hebrew, Chinese, and contemporary Western instruction in reading and writing that span the *longue durée* show remarkable similarities. And the differences can be explained much more readily by the writing system itself, and in some cases by the culture surrounding this writing, than by other factors. The history of education as the history of writing, in other words, is not a tale of ever-improving technologies and techniques, of innovations that radically improve how writing can be taught or learned. It is also not an account of research breakthroughs that might redefine the parameters of writing practice or instruction. Finally, *contra* Dewey, the history of education is not one in which undesirable and arbitrary practices are maintained simply because of "that mysterious thing

called a school." Whether in ancient Nippur or Beijing, or some 40 centuries later in New York or Bogotá, reading and writing are skills reproduced from one generation to the next through carefully constructed and recognizably patterned physical arrangements and temporal sequences of instruction and practice. The forms, practices, and sequences of inscriptive instruction, in other words, appear as viral and tenacious as writing systems themselves.

The remainder of this book will consider how these continuities in instructional sequences, exercises, and methods remain and evolve—even as tools and circumstances for creating and exchanging text continue to change. In succeeding chapters, I will reduce my focus somewhat, from thousands to only hundreds of years, and from Asia, Europe, and the Middle East to the modern West. I will not compare material practices over millennia but will review ideas and practices concerning instruction and education over the last few centuries—looking in particular at changes and stabilities in Europe in both theory and practice in the wake of the invention and spread of the printing press.

PART II / Media, Psychology, and Theory

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Chapter Three

Psychology and the Rationalist "Transcript of the Mind"

> The central fact about our psychology is the fact of mediation.
>
> —LEV VYGOTSKY, 1933

Writing as a medium is closely intertwined with education and its history—or rather, its histories. Writing instruction was the basis for a "curriculum" in Nippur millennia ago and for recognizable patterns of instruction in traditional Chinese and Jewish education as well. And, of course, writing instruction is still the basis for special curricula, materials, teaching techniques, and ruses around the globe today. Seen over the *longue durée*, education as "the systematic instruction of children" appears inseparable from writing. But how has writing—and by extension, education, its theory, and psychology—been understood over the centuries leading up to our own?

Lev Vygotsky, the founder of constructivism as a (social) theory of learning—today the most widely embraced learning theory[1]—sees the mediation of writing and the work of education as inextricable: "Mediation," he suggests, is not simply the central fact of education, but "the central fact about our *psychology*" (emphasis added). Approaches to education and instruction, from Socrates and Rousseau to Dewey, from Jean Piaget to today's constructivists, all deal centrally with mediation, even though the question of mediation tends not to be raised explicitly in their approaches. In this chapter, I examine the slowly changing understanding of teaching, learning, and the mind in relation to different media from the scientific revolution to the information revolution. Over this particular (and shorter) *longue durée*, the media in question are not digital or electromechanical. In almost all cases, they boil down to the two media

forms or possibilities: speech and writing and their different characteristics. Although words on paper or spoken in person may not be considered particularly impressive as modes of communication today, they were once debated with a great deal of passion and intensity. Much deference and even praise has been directed at one, while the other has been subjected to the harshest judgments and condemnations—even while it remains indispensable in practice. And undercurrents of these strong feelings can be detected in a great deal of educational theory and debate today.

Again, I begin my examination by going back briefly to a number of ancient starting points. For monotheists, specifically Christians, Jews, and Muslims, the written "word of God" is considered to be *the* instance of writing. It is *the* book, *the* word, and it is also holy and inviolable: it is God's revelation of His Truth to mortals. Writing and the written truth are seen as having come down to us as from "on high," often through the mediation of angels, demigods, or a priestly class. The cinematic image of a bearded and holy Moses descending with tablets of the law freshly inscribed by God offers a familiar if stereotyped version of this idea. This legend of the tablets and the law is central to all three monotheisms; consequently, in these religious communities and traditions education and learning can be said to have been conceptualized overtly in terms of what is *written*. However, speech still remains indispensable as an affirmation of the ultimate truth of what is written: Mohammed was commanded to read (or, rather, "recite") what was written in his vision outside Mecca. Both Christians and Jews are exhorted in the book of Joshua to "keep [the] Book of the Law always on your lips; [to] meditate on it day and night, so that you may be careful to do everything written in it."[2] The written book is the authority, but its force is realized only when it is kept always on one's lips—when it is spoken aloud.

But this is only one way of viewing the relationship between text and speech. It is widely acknowledged that Socrates, the philosopher-gadfly of Athens, worshipped neither the written word nor the book. He instead roundly condemned writing as "inferior to speech," as a weak and vulnerable "bastard son" of knowledge. "When an attack is made upon this bastard," Socrates argues, writing itself can "give no answer to a question."[3] Regardless, Socrates remains the first and paradigmatic "educator" or "teacher" in the West. Socrates considered a person's quick memory and ability to engage in a lively exchange or debate as the essence of pedagogy and teaching. This so-called Socratic method was long seen as the principal means by which we learn or arrive at truth—even if it is just the "truth" of our own ignorance. At the same time, though, the only reason we have a

record of Socrates's contentious exchanges is because of his legendary student-stenographer Plato.

The origin of spoken language, on the other hand, is seen quite differently in the Western tradition. Speech, or language, does not appear as a godly intervention into troubled human affairs, but as part of the process of creation itself. Again common to Christianity, Judaism, and Islam, the story of the Garden of Eden describes spoken language as a "natural" part of life, before the fall and expulsion of humans from this ideal state. The closest thing to an "origin" of the spoken word in this narrative is Adam's naming of the plants and animals of God's creation—and his open conversation with his creator. Spoken language is similarly seen as a primal and preexisting condition in other traditions, including Hindu culture, in which the Vedas (literally "knowledge") are still chanted by heart. Indeed, this Vedic chanting represents the oldest unbroken oral tradition on the planet, and it still links the living present to a pre-textual, prehistoric past without any necessary reliance on a textual record. In this and other contexts, writing—if it appears at all—shows up only later, as a kind of invention or interposition. Often, it appears as a "remedial" form, an intervention into a flawed human condition to give humans what the gods already have, or to hand down a set of laws to a disobedient and unruly people. This idea is illustrated in another Western example—the Greek god Prometheus, described by the tragedian Aeschylus as having stolen from Zeus not just fire but also writing to give to us mere mortals. His punishment for this act was to be bound to a rock, with a crow forever feeding on his liver.

In Chinese mythology, writing is said to have been invented not by a deity but rather by the fabled sage Cangjie, a minister in the court of the mythical Yellow Emperor. Legend has it that writing was inspired by the unique hoofprint of a dragon. Its invention served as a communication tool between gods and ancestors in heaven and mortals on earth. (Today, the name "Cangjie" has been memorialized as a method for inputting Chinese characters using standard computer keyboards.) Still, the timelessness of the written word is also lifeless unless it is given life through speech.

All of these mythological, religious, and philosophical accounts communicate clear judgments concerning spoken and written media: speech is original and authentic, but it is flawed when compared to the fixity of writing and the written law. Similar assessments and valuations are not as foreign to today's debates about education and educational media as one might think. Insistence on the "authenticity" of the face-to-face meeting of teacher and student, on seeing a famous

speaker in the flesh, or on the importance of writing down one's proofs or arguments in "black and white" for all to see are commonplace today. Consequently, in this chapter I explain how philosophical, religious, or even mythological undercurrents can be detected in a great deal of theory and debate today concerning educational media and technology. These patterns persist to this day, often at great cost to taxpayers and students.

Three crucial figures in education over the last 400 years, two of whom are largely forgotten, represent variations on the countervailing currents or arguments described above. The first of these is John Amos Comenius (1592–1670), widely regarded as the father of modern education, and also heralded as an early innovator in educational media or technology. Comenius authored an early children's picture book and the first children's encyclopedia (*Orbis Pictus*, or *Visible World in Pictures*), which was read for centuries by children around the world. Comenius decried rote memorization and advocated for lifelong learning and universal education for all people, regardless of nationality, class, or (dis)ability. Overall, the "influence of Comenius on educational thought," according to one source, "is comparable with that of his contemporaries, [Francis] Bacon and [René] Descartes, on science and philosophy."[4] Comenius also embodied a tradition that valued writing, print, and books "higher than gold and precious stones," as Comenius himself put it.[5] Comenius is a key figure in an educational tradition that sees writing as *the* authoritative medium and emphasizes (as does writing itself) questions of structure, rules, and grammar. I call this the "rationalist" tradition.

The second individual is the much more well-known Jean-Jacques Rousseau (1712–1778), a prolific thinker and writer who helped found the "romantic" tradition in culture and education. He is said to have "had more effect upon posterity than any other writer or thinker in the eighteenth century"—an epoch "in which writers were more influential than they had ever been before."[6] Rousseau was quoted (in chapter 1) as "hating books," but he was ultimately of two minds about writing and texts.

The third major figure, following in Rousseau's footsteps, is Johann Heinrich Pestalozzi (1746–1827), an educational superstar of his time, who established broadly "romantic" principles in everyday educational practice. (Many of these principles remain important to this day.) Together, these came to be known as "the universal method." Through this method, uneducated peasant children were said to learn to read, write, and understand arithmetic *perfectly*—all in a matter of months. Pestalozzi caused the greatest excitement in Europe and beyond,

rendering trends in education today—from big data to big science—pale by comparison. In his own time, Pestalozzi was celebrated as "the Columbus of intellectual human education," compared to the founder of Protestantism, Martin Luther, and even heralded as a latter-day Christ figure.[7]

The beliefs and theories of these three individuals have since been reinterpreted and reconfigured for modern psychology and education. On the rationalist side, there is Noam Chomsky and his "Cartesian" cognitivism, with its emphasis on rational, rule-bound "information processing," and others who follow in his footsteps. Another philosophy is represented in the latent romanticism in John Dewey's educational theory and in later approaches to learning in the twenty-first century that share his conviction that education should be as easy as learning one's first language. These psychologies, from early cognitivism in the 1970s to theories of today's digital natives, can be seen to understand the value of media and digital educational technologies either in terms of their spontaneous "naturalness" typical of speech or a similarly deep-seated rationality exemplified in writing. Media and their mediation, as I will show, are indeed the central fact of our psychology—just maybe not in the sense that one might initially think.

The "Absolute Privilege of Writing"

Although rationalist and romantic views of writing and speech are likely prefigured in earlier times, my examination begins in the seventeenth century, the time of Comenius and a period of great importance for education. This was a time still energized by the invention of the printing press some two centuries earlier, and a time that marked the beginning of the scientific revolution. Printing had already spread across Europe and beyond, and printing presses had produced a great many books. For that reason it is not surprising that the written or printed word had gained a central place in the culture of the time, both in the thinking of Comenius and in the thinking of his most famous contemporaries.

Michel Foucault, a historian and theorist who was deeply influenced by Braudel's notion of the *longue durée*, studied the relationship of "words and things" in early seventeenth-century discourse. Foucault characterizes this period as being marked by the "absolute privilege of writing." It is a time, he says, in which "it is the primal nature of language to be written. The sounds made by voices provide no more than a transitory and precarious translation of it. What God introduced into the world was written words; Adam, when he imposed their first names upon the animals, did no more than read those visible and silent marks; the Law

was entrusted to the Tablets, not to men's memories; and it is in a book that the true Word must be found again."[8]

God's word and his law were seen as something decidedly written, not spoken. Any reliable and original truths were to be found in "visible and silent marks" rather than in any "transitory and precarious" acts of speech. Writing, and more precisely the written word as it was printed in books, was seen as the ideal form or medium for knowledge. Educators, philosophers, and scientists all seemed inclined to think that the world and its truth appeared in the form of an all-encompassing "book of nature": the " 'great metaphor,' " as Foucault says, of a "book that opens, that one pores over and reads in order to know nature."[9] Galileo (1564–1642), for example, ventured that "the book of nature is written with mathematical symbols. More precisely: Nature speaks the language of mathematics: the letters of this language are triangles, circles, and other mathematical figures. [It is a book] perpetually open to our eyes. But being written in characters different from those of our alphabet, it cannot be read by everyone.[10] Galileo saw his task as the decipherment of these characters to show how God's truth and reason were inscribed in the geometry of the heavens.

René Descartes (1596–1650), for his part, saw one's ability to read the book of God's works as involving a similar kind of deductive "decoding": "[When] we want to read something written in an unfamiliar cipher which lacks any apparent order[,] what we shall do is to invent an order, so as to test every conjecture we can make about individual letters, words, or sentences, and to arrange the characters in such a way that by enumeration we may discover what can be deduced from them."[11] We must invent possible orders of meanings—or hypotheses—so that they can be tested against the ciphers with which we are presented. In that way, we can see if they render these silent and visible marks meaningful. After all, Descartes concludes, "It would hardly have been possible for so many items to fit into a coherent pattern if the original principles had been false."[12] In other words, nature is originally ordered in a rational way by God, and it is up to us to discover the logic and significance of this order through our own rational efforts, either through geometry and mathematics (for Galileo) or by "test[ing] every conjecture we can make about individual letters, words, or sentences" (as Descartes put it). The correct (re)construction of this original, universal, and above all written language was a central goal for many thinkers and educators in the early seventeenth century.

However, there was also a much darker side to this time. Despite the advances of the scientific revolution, religious strife, persecution, and outright warfare pre-

vailed around the towering intellectual figures of the time. The situation ranged from censorship and riots in France to civil and religious warfare in England and some of the bloodiest and most destructive wars that central Europe has ever known. This tumult invariably touched the lives and times of those already mentioned. It is well known, for example, that Galileo was tried, excommunicated, and imprisoned by the Catholic Church for the heretical conclusions of his astronomy. And René Descartes chose to live much of his life not in France, but in the more tolerant and open cultural environment of the Netherlands.

Of all of these figures, Comenius was perhaps the most deeply affected, constantly in flight from war and misfortune. But, he never gave up hope: "And now, I see my country, her churches and her schools all in ruins. Yet when the fire of war was spreading beyond her borders to seize first the neighbouring countries and then the whole of Europe, and was threatening the Christian world with disaster and desolation, I had no greater comfort than I found in the ancient promises of God concerning the supreme and final Light, that it should in the end put darkness to flight."[13] The light Comenius sought—as well as the darkness and destruction he fled—shared the same root cause: language, whose multiplicity and ambiguity were the source of confusion and mistrust between nations. Language for Comenius was simultaneously the cause of and the cure for humanity's ills. Speaking again in terms of God and the supreme light, Comenius continues: "[W]e believe that there is one, but a very powerful, obstacle in the way of penetrating all nations with this Light, the obstacle which consists in the multitude, the variety, the confusion of languages: we have been bold to attempt the removal of this hindrance by . . . establishing a language absolutely new, absolutely easy, absolutely rational, in brief a Pansophic language, the universal carrier of Light."[14] This absolutely easy, absolutely rational language, the ultimate "carrier of light," is "pansophic" in the sense that it is itself knowledge (*sophia*) that is *pan*oramic or global, illuminating all equally.

Not surprising for the sixteenth century, this language of light for Comenius was ultimately written: clearly defined and standardized to reflect reality in its ultimate simplicity, written language would banish the errors, confusions, and prejudices of nations, with their individual languages and local dialects. Like Galileo's "language of mathematics," or Descartes's "coherently patterned . . . cipher," the language Comenius envisioned had its own particular logic and coherence: its "course," he says, "is parallel with the course of things . . . it contains neither more nor fewer names than there are things; and joins words to words with the utmost precision as things are joined to each other."[15] Also like

his contemporaries, Comenius saw this language or writing as embodied above all in a book—one uniquely powerful and universal: "And if any human aid were needed for this I thought that it could only come from the better instruction of the young in all matters from the most elementary and fundamental. . . . With this end I thought that a book of universal scope must be produced, under the guidance of which the minds of men gradually advancing from darkness into light should be led from the delusions which had crept over them into the one simple way of Eternal Truth."[16]

The educational, political, and historical imperative implied in Comenius's thought is clear: the world could move from warfare and darkness into peace and light only if people could learn first through a perfect language—and the perfect book. Such a book would present the visible world using a written language that is ideally suited to the task, simultaneously forming a "transcript . . . of the Notions innate in the mind." "Whoever shall read and understand this book," Comenius confidently predicted, "shall at the same time read and understand himself, the nature of the world, and God."[17]

Needless to say, Comenius never published this ultimate book that would bring mind, self, and nature together into perfect union. However, he did complete what he suggested was a "lesser and introductory" version of it—his *Orbis Pictus*, published in dozens of translations and read well into the nineteenth century. This compact children's encyclopedia embodies Comenius's beliefs about education and language as clearly as anything he composed. Indeed, it can be said to represent a technology, a specifically educational medium or media form, that took full advantage of the possibilities enabled by the printing press. Figure 3.1 shows a page from this text that illustrates a range of technical innovations whose mass production was effectively impossible before Gutenberg: numbered images and figures presented together with corresponding listings in multiple languages of specially formatted text.[18]

Orbis Pictus brought together about 150 enumerated diagrams and multilingual listings dealing with themes ranging from the minerals of the earth to the trades and professions of society to the cyclical "apparitions of the moon." As Comenius himself explained, this arrangement or "device" allowed him to "be clear, and by that, firm and solid"—to ensure that everything presented was "not obscure, or confused, but apparent, distinct, and articulate, as the fingers on the hands." "The ground of this business," Comenius continued, "is that sensual objects may be rightly presented to the senses, for fear they may not be received."[19] In terms of educational media, Comenius's project was powerful but paradoxical. While

The chiefeſt Good, *and the only and inexhauſted Fountain of all good things.*

As the Creator, *ſo the* Governor *and* Preſerver *of all things, which we call the* World.

Summum *Bonum*, et ſolus et inexhauſtus Fons omnium Bonorum.

Ut *Creator*, ita *Gubernator* et *Conſervator* omnium rerum, quas vocamus *Mundum*.

The World. III. *Mundus.*

The Heaven, 1.
hath Fire, *and* Stars.
The Clouds, 2.
hang in the Air.
Birds, 3.
fly under the Clouds.
Fiſhes, 4.
ſwim in the Wa er.
The Earth *hath* Hills, 5.
Woods, 6. Fields, 7.
Beaſts, 8. *and* Men, 9.

Cælum, 1,
habet *Ignem & Stellas.*
Nubes, 2.
pendent in *Aere.*
Aves, 3.
volant ſub nubibus.
Piſces, 4.
natant in *Aqua.*
Terra habet *Montes*, 5.
Sylvas, 6. *Campos*, 7.
Animalia, 8. *Homines*, 9.

Thus

Figure 3.1. Enumerated visible things of "The World," from *Orbis Pictus*, with corresponding terms in English and Latin. With the naked couple, the image presents a clear reference to the biblical Garden of Eden. Adam, who is pointing and speaking, is presumably labeling the world around him. He does this all, of course, in a logical and straightforward manner. *Source:* Comenius, *Visible World*

his aim was to get as close to the underlying, natural, universal, and "pansophic" transparency of language as possible, to do so he had to resort to the newest and most artificial of media of the time: mass-produced and numbered schematic engravings and closely coordinated textual explanations.

The ideal of a printed, eminently rational language of identification, explanation, and calculation is indispensable in connecting the rationalist tradition of the early seventeenth century with contemporary developments. One crucial connection is provided by the enormous influence of a recent self-described "Cartesian rationalist," the linguist and public intellectual Noam Chomsky. "Not only did Chomsky redefine the entire academic discipline of linguistics," as David Golumbia explains. "His work has been something close to definitive in psychology, philosophy, cognitive science, and even computer science."[20] Seeing his own work as a continuation of seventeenth-century rationalism, Chomsky titled one of his key publications *Cartesian Linguistics: A Chapter in the History of Rationalist Thought* (1966). He has also defended his rationalism in popular publications and events—including a now-famous debate with Michel Foucault. In short, "Chomsky's mark endures precisely . . . in the new mechanical-rationalist position he licensed in the heart of Western philosophical practice." And this position, Golumbia emphasizes, comes directly from "the tradition of . . . the 17th century."[21]

The key to Chomsky's rationalism is a belief not only in the absolute privilege of writing, but also in an understanding of the mind as a clockwork or computational mechanism—one operating with unvarying and rule-bound indifference to impulse and emotion. Notions like "deep" versus "surface" processing, "generative" processes, "transformation," even neurological "hard wiring"—all of which are indispensable to theories of education and its media today—can readily be traced back to Chomsky. However, before discussing the rationalist position further I turn to the opposing romantic position or tradition by considering developments following on Galileo, Descartes, and Comenius some 350 years ago.

Chapter Four

The Romantic Tradition

"A Cry of Nature"

The period following the seventeenth century saw the emergence of a strong counterreaction to the rationalist tradition and its belief in the logical and decipherable nature of mind and world. Jean-Jacques Rousseau, famous both as an early romantic and an educational theorist, did much to establish the foundational elements of education as a "romantic enterprise"—elements that remain important in education and educational media and technology to this day. Chapter 1 quoted Rousseau as saying, "I hate books; they only teach us to talk about things we know nothing about." Rousseau starts his *Essay on the Origin of Languages* (1781) in the same spirit. Unlike the rationalists, he does not speak of the world as a single coherent book written by God at the time of creation, to be deciphered through human reason. Language, Rousseau boldly asserts, "did not begin by reasoning but by *feeling*. . . . In order to move a young heart, to repulse an unjust aggressor, nature dictates accents, cries, complaints. The most ancient words are invented in this way, and this is why the first languages were tuneful and passionate before being . . . methodical and reasoned."[1]

Language for Rousseau is not exemplified in logical encoding or in the rational order of nature; it is not a matter of reading and decoding visible and silent marks. Rousseau insists that language is not originally based on grammar, rules, and logic, but on expression and feeling. "Man's first language," he says, "was the cry of nature."[2] A cry of joy might naturally become a word for pleasure; a threatening growl, a command in warfare. Instead of assigning an absolute privilege to

writing, romanticism assigns that privilege to speech and the voice, its cries, tones, and accents.

Language, Rousseau explains, has been alienated from its original, natural condition by the introduction of writing, and even more forcefully by the printed word. It is deprived of its original energy, passion, and musicality and becomes abstract: "The more voices become monotone, the more consonants multiply, and that as accents are eliminated and quantities are equalized, they are replaced by grammatical combinations and new articulations. . . . Writing, which seems as if it should fix language, is precisely what alters it; it changes not its words but its genius; it substitutes precision for expressiveness. *Feelings* are conveyed when one *speaks* and *ideas* when one *writes*."[3] Writing and books, according to Rousseau, do not simply record language but fundamentally reconfigure it. They take away its expressiveness and change it into something equalized, monotone, and abstract. Rousseau goes on to argue that writing also produces speech that is similarly sapped of its meaning and vitality: "In writing, one is forced to take all the words according to common acceptation . . . it is not possible for a language one writes to keep for long the liveliness of one that is only spoken. . . . The means taken up to compensate for this quality [work to] diffuse, [and] elongate written language and, passing from books into discourse, enervate speech itself."[4]

Writing for Rousseau, perhaps harking back to Socrates, is hardly a gift from the gods, a divine means through which holy truths are preserved for our worship and edification. Instead, it is a falsification of originally tuneful and passionate expressions of feeling, of accents or cries of joy or sorrow. Grammar and rules of "common acceptation"—as well as a general "methodical and reasoned" quality—become dominant in language only when language falls under the influence of writing and abstract ideas. It completely loses its ties to the natural feelings and expressions with which it began.

Despite differences with Comenius, Rousseau also developed his views as an educator in a manner entirely consistent with his understanding of writing, speech, and language. In *Emile*, his famous novel of education, Rousseau recommends that his young protagonist not be exposed to books or otherwise given "lessons" until well into his adolescence. Rousseau sees programmatic instruction and any concerted effort to teach reading and writing as harmful and unnecessary, something to be postponed for as long as possible: "At twelve Emile will hardly know what a book is. But, it will be said, he certainly must at least know how to read. I agree. He must know how to read when reading is useful to him; up to then it is

only good for boring him."[5] Until reading and writing can no longer be avoided, the communicative practice that the child should engage in or be exposed to should only be *spoken*.

Rousseau goes further, declaring, "I am almost certain that Emile will know how to read and write perfectly before the age of ten, precisely because it makes very little difference to me that he knows how before fifteen. But I would rather that he never knew how to read if this science has to be bought at the price of all that can make it useful. Of what use will reading be to him if it has been made repulsive to him forever?"[6] Emile, paradoxically, will learn to read and write precisely because of Rousseau's general indifference toward those activities—"because it makes very little difference to me." And of course this learning will take place without lessons and indeed while Emile is "hardly knowing what a book is." Rousseau believes that "natural" learning and mastery of texts will succeed specifically because he is so careful to avoid the artificiality of books and texts.

However, Emile's learning and education are utterly dependent on writing, no matter how vehemently Rousseau—and others after him—might want to deny it. Emile will still learn to read, and Rousseau insists that he will also come to speak "a French just as pure as I can know it, but he will speak it more distinctly and will articulate it much better than I do."[7] This French, one can only assume, is not one of sonorous cries and accents, but a French that strictly follows rules and regulations dictated to this day in writing from Paris, the center of French culture and bureaucracy.

These paradoxes in Rousseau's account of education, speech, and writing have not gone unnoticed. Almost two centuries later, a famous modern (or rather, postmodern) French philosopher, Jacques Derrida, perceptively deconstructs these incongruities: "The speech that Rousseau raise[s] above writing is speech as it should be or rather as it *should have been*. . . . He valorizes and disqualifies writing at the same time. . . . Rousseau condemns writing as destruction of presence and as disease of speech. . . . [At the same time, he] rehabilitates it to the extent that it promises the re-appropriation of that of which speech allowed itself to be dispossessed."[8] Rousseau, in other words, condemns writing and books as the "curse of childhood," while at the same time he relies utterly upon them. His reliance is clear in his insistence on the distinctness and articulation enabled by writing in ensuring the precision and purity of the child's speech. Speech has lost its naturalness and vitality through the influence of writing, but it is ultimately through writing that speech for Rousseau will regain its original purity

and natural expressive force. Writing and text, as I show below, are acceptable in the romantic tradition only insofar as they can be assimilated to and used to support a kind of ideal natural speech.

J. H. Pestalozzi: "A Simple and Direct Short Circuit"

The instructional implications of Rousseau's ideas about writing and speech—and of the fundamental contradiction that underlies them—are illustrated in Rousseau's most famous educational disciple, J. H. Pestalozzi, whose method can be described as a translation of Rousseau's intense feelings about reading and writing into the most practical instructional terms. In transforming theory into practice, Pestalozzi also generalized Rousseau's prescriptions: from the elite education of a single child by an educated master to the bourgeois teaching of the masses at home and in school. Like Rousseau, Pestalozzi wrote his prescriptions in the form of a novel. His was called *How Gertrude Teaches Her Children*. And like Rousseau's Emile and his patient tutor, both the mother and her children were meant to stand for all mothers (or teachers) and their children. Finally, also like Rousseau, Pestalozzi discusses how children will learn to read and write precisely by focusing on speech rather than text:

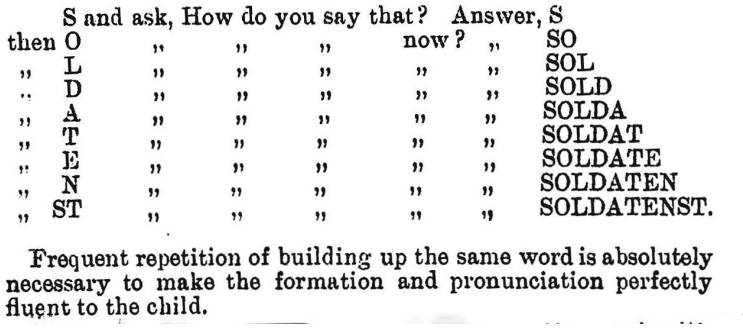
> Gertrude . . . was in no haste for them [her children] to learn to read and write. But she took pains to teach them early how to speak; for, as she said, "of what use is it for a person to be able to read and write, if he cannot speak?—since reading and writing are only artificial sort of speech." To this end she used to make the children pronounce syllables after her in regular succession, taking them from an old A-B-C book she had. This exercise in correct and distinct articulation was, however, only a subordinate object in her whole scheme of education, which embraced a true comprehension of life itself.[9]

In essence, what Pestalozzi was advising here later came to be known as his "phonetics"—a nineteenth-century version of what we now call phonics. The key in both *Emile* and *Gertrude* was the child's awareness of the spoken parts of words, syllables, and even phonemes (the smallest units of sound in a language). This awareness then served as the basis for recognizing (reading) and spelling (writing) the word. It all began with what Pestalozzi—like Rousseau and even the creation myths of old—saw as the first and most natural form of communication and learning: spoken language.

Pestalozzi considered his phonetics and his other methods perfectly "natural." They reflected for him "a true comprehension" of the everyday world of the

child, based in children's normal developmental course. Pestalozzi's work has even been described as being based on psychological laws—one of the first instructional approaches for which this claim was made. Anything suspected to be unnatural or "un-psychological"—specifically the "artificial sort of speech" represented by writing—was to be carefully avoided. To avoid unnecessarily early exposure to text and writing, Gertrude covertly relied on a text, specifically an old "A-B-C book," where she found the syllables that she had her children "pronounce . . . after her in regular succession." This same "old A-B-C book," according to Pestalozzi, was then used to structure more extensive "exercise[s] in correct and distinct articulation." The idea was to use text and print to help produce the most completely "natural" form of speech—speech that, Pestalozzi indicated, would be just as "pure" as Emile's "purest French."

Despite his insistence on the natural and psychological (rather than cultural or historical) aspect of his techniques, Pestalozzi's "method," like that of Comenius, was highly dependent on the print media and technology of his time. Figure 4.1 shows a carefully constructed sequence of questions that formed the child's first exposure to the written or printed word. That exposure was only to occur, however, after the "exercises in correct and distinct articulation" were completed: "When this is done, I let him see first single letters, then two or three together, letting him hear the sound as he looks at them, and when he has fixed the order in which they are placed in his memory, he pronounces 2, 3, or 4 together like one."[10] In the example provided here, the letter combinations and their pronunciation were from a word (strangely in this case, "Soldatenstand," or "military service"). In the exercise, the teacher (or


S and ask, How do you say that? Answer, S

then O ,, ,, ,, now? ,, SO
,, L ,, ,, ,, ,, ,, SOL
,, D ,, ,, ,, ,, ,, SOLD
,, A ,, ,, ,, ,, ,, SOLDA
,, T ,, ,, ,, ,, ,, SOLDAT
,, E ,, ,, ,, ,, ,, SOLDATE
,, N ,, ,, ,, ,, ,, SOLDATEN
,, ST ,, ,, ,, ,, ,, SOLDATENST.

Frequent repetition of building up the same word is absolutely necessary to make the formation and pronunciation perfectly fluent to the child.

Figure 4.1. Exercises for pronunciation, specifically of the word *Soldatenstand*, from Pestalozzi's *How Gertrude Teaches her Children*. *Source:* Archive.org

mother) was to question the child about the sound of each letter in the word. Each new letter was added to the one(s) coming before, until, through cumulative repetition, the sounds and the letters of a word in its entirety were sounded or spoken aloud.

Figure 4.2 shows a mother teaching her children through a simplified version of this exercise, pointing out short syllabic combinations on a board for her children to pronounce aloud.

In these kinds of activities, the mother's voice, and even her mouth itself, came to be seen as having a special role. Pestalozzi praised this "instrument," saying of the child that this "mouth that smiled on him so often from the day of his birth, the voice that from the day of his birth has so often foretold joy" is now the voice that "teaches him to talk." This same mouth even came to be seen by other educational theorists as a "device" of sorts—"an instrument upon which . . . certain meaningful tones that together we call language" are "played."[11] In addition, this instrument and these techniques—sounds, letters, and the timing of their performance—required a kind of manual to be "played" or performed correctly. Given Pestalozzi's celebrity, it is perhaps not surprising that a veritable flood of manuals arose to help others teach as Gertrude taught. Media theorist and historian Friedrich Kittler explains: "Around 1800 a new type of book began to appear, one that delegated to mothers first the physical and mental education of their children, then their literacy."[12] Kittler, like Derrida before him, is keenly aware of the incongruity between the valorization of speech by the romantics and their ultimate reliance on writing, A-B-C books, and manuals for mothers:

> A simple and direct short circuit characterized [this] pedagogical discourse. Educational tracts and primers written explicitly for mothers obliterated their own textuality for the sake of their [users. Pestalozzi's] phonetic method . . . substituted for the textuality of the book and alphabet a Voice [sic] that neither read aloud nor imitated, but instead spontaneously created the pure sounds of the high idiom or mother tongue. . . . For the sake of the Mother, a book would forget being a book. Pestalozzi made this short circuit explicit in his joyful exclamation, "The book is not yet there, and already I see it disappearing again through its effects!"[13]

These books—like books in general in the romantic tradition—were of value only insofar as they disappeared behind the natural speech that they fostered, prompted, or enabled. Even though these embodiments of "artificial speech" were

Figure 4.2. Illustration from one of the many books for mothers published in Pestalozzi's time. The board used for instruction shows the alphabet, followed by phonetic letter combinations (e.g., fa, fe, fi). The text at the bottom advises children: "Hold your mother doubly in honor; she both loves and educates you." *Source:* Stephani, *Fibel für Kinder* frontispiece (Google Books)

indispensable, manuals and other books constantly worked to erase their own artificiality and presence.

A "simple and direct short circuit" similar to the one undertaken by Pestalozzi can be said to characterize the pedagogical prescriptions of other broadly romantic educators. In keeping with both Rousseau and Pestalozzi, John Dewey labels the belief that children should learn reading and writing in the early grades as a "false educational god." He also sees any deliberate or programmatic instruction in reading as something to be avoided, or at least postponed. Speaking approvingly of students in one experimental classroom in 1915, Dewey asserts that "reading is not to them an isolated exercise; it is a means of acquiring a much-desired object. Like climbing the pantry shelves, its difficulties and dangers are lost sight of in the absorbing desire to satisfy the mental appetite . . . Hence, the actual learning to read is hardly a problem; children teach themselves."[14]

Elsewhere, Dewey appeals somewhat mysteriously to the contemporary teacher's "power to transmute [written] symbols and contents into their working psychical equivalents."[15] In his modern industrialized age, it almost seems as if Dewey sees a natural, textual fluency arising by virtue of the omnipresent circulation of knowledge itself. The book and the difficulties presented by the written text all but disappear in the sheer speed and ubiquity of information. The simple and direct short circuit for Dewey, in other words, takes the form of a sort of "transmutation" of the knowledge suffusing the world around the young student directly into that same student's own knowledge and ability.

Chapter Five

Romantic versus Rationalist Reform

Thus far, this book has focused on the past: first the *longue durée* of the history of writing and then approaches to language and reading instruction that have arisen since the printing press. The point of this focus was not to learn from the mistakes of the past. The histories I've presented are not about grievous errors that were made once and that are now to be avoided. Pestalozzi was not wrong when he developed his phonetic method. The rational language that so excited Galileo and Descartes was not a mistake in need of correction. Instead, Pestalozzi's approach is still known and valued today as phonics. And Chomsky sees his influential cognitive and linguistic theory as following directly on Descartes and seventeenth-century rationalism. In these cases, the past is not just baggage that weighs down the present; instead, it lives on today. The accumulated ideas and methods of the past are what make today's education and educational theory possible in the first place.

It is also no secret that education is closely wedded to the past. Schools and entire educational systems are not things that can be designed and developed *ex nihilo*, as if from scratch. We can't simply and arbitrarily stop educating children for some period of time so we can redesign and rebuild educational systems according to new and "scientific" models and principles. And, as I have shown, education relies on, and its history is profoundly shaped by, the most primary of cultural factors: language—and above all, writing. Language and writing represent systems and technologies with their own dynamics that are also fiercely resistant

to any deliberate reengineering or optimization. So exactly how are the echoes and reflections of Descartes, Pestalozzi, Rousseau, and Comenius still to be detected today? Of course, as is clear from my introduction, the arguments of a romantic like Rousseau—and after him, Pestalozzi—are repeated by reformers today. Those who say that schools need to free children from their books and writing tasks, and to let them learn in ways more natural and spontaneous, are not saying those things for the first time. They clearly reflect the romantic impulses of Rousseau, Pestalozzi, and Dewey. Looking at this from the perspective of media, however, reveals something more. As I will demonstrate, these modern reformers, like the earlier romantics, also gravitate toward the spoken word as their model. They take early language learning—rather than the process and products of reading and writing—as their paradigm for all learning. Mediation is the central fact of their psychology. Specifically, the mediation of the spoken word as an echo of the original "cries of nature" is crucial for them.

On the other hand, many tend to see teaching and learning in terms of cracking a code, leveraging the underlying, rational, rule-bound logic of the mind as the key to educational success. Terms like "deep" versus "surface" processing, "generative" processes, or neurological "hard wiring" are among their watchwords. Their interest is not in returning to cries and emotions of nature, but in getting closer to the clarity, rationality, and universality that they see exemplified in the rules and structures most evident in the written word. Education and its psychology must leverage the "visible and silent marks"[1] of writing and the grammatical rules and structure that govern their use. To borrow Comenius's words, these efforts must seek a "transcript . . . of the Notions innate in the mind"[2]—a written record that is "apparent, distinct, and articulate;" and at the same time "clear, and by that, firm and solid."[3] Mediation—in this case, the mediation of writing—is the central fact of this psychology. It takes the mediation of writing as its paradigm, as the basis for understanding teaching and learning.

Romantic Reform: Papert, Schank, and Prensky

So how do these rationalist and romantic approaches to mediation and education translate into contemporary views on education and its media? Consider one of the early advocates of computer media or technology in the classroom, Seymour Papert. Papert had long argued that schools and their arduous curricula were only holding children back. In his famous *Mindstorms* (1980), Papert wrote for example that "the model of successful learning is the way a child learns to talk, a process that takes place without deliberate and organized teaching. I

see the classroom as an artificial and inefficient learning environment . . . [and] I believe that the computer presence will . . . [mean] that much if not all the knowledge schools presently try to teach with such pain and expense and such limited success will be learned, as the child learns to talk, painlessly, successfully, and without organized instruction."[4]

For Papert, as for Dewey before him, the classroom and the school appear as somewhat mysterious places, where children must carry out "more or less arbitrary tasks" and learn with "pain" and "limited success." The classroom appears all the more arbitrary and mysterious given that when it comes to language acquisition, children seem to learn most effectively "without organized instruction"—and without the unnecessary "pains" of the school and the classroom. But Papert takes this argument one significant step further: he posits that something similar to natural language learning takes place when children learn to program a computer. After all, Papert saw learning to program as simply learning a language that is also used to communicate and to creatively express oneself. Why not utilize children's natural and powerful capacity to acquire their first language(s) to also learn computer languages? "Programming a computer means nothing more or less than communicating to it in a language that it and the human user can both 'understand.' And learning languages is one of the things children do best. Every normal child learns to talk. Why then should a child not learn to 'talk' to a computer?"[5]

Papert goes on to argue that computers present to children not only a language, but also a "living" linguistic environment or culture—specifically an environment of math and geometry. Children's natural abilities in language learning can thus be extended even further to include these other school subjects: "The computer can be a mathematics-speaking and an alphabetic-speaking entity. . . . When this communication occurs, children learn mathematics as a living language. . . . The idea of 'talking mathematics' to a computer can be generalized to a view of learning mathematics in 'Mathland'; that is to say, in a context which is to learning mathematics what living in France is to learning French."[6] Unlike France, though, there are no names, times of day, or even other people in this place called Mathland. In their place is a textual interface that allows the student to compose lines of code, instructing the computer to draw lines and shapes in this imaginary world. The computer "replies" in this "conversation" by displaying executed operations, or presenting error messages (figure 5.1).

Although Papert's approach did not produce the kind of efficient and effortless learning that he promised, his argument that all learning should be as easy

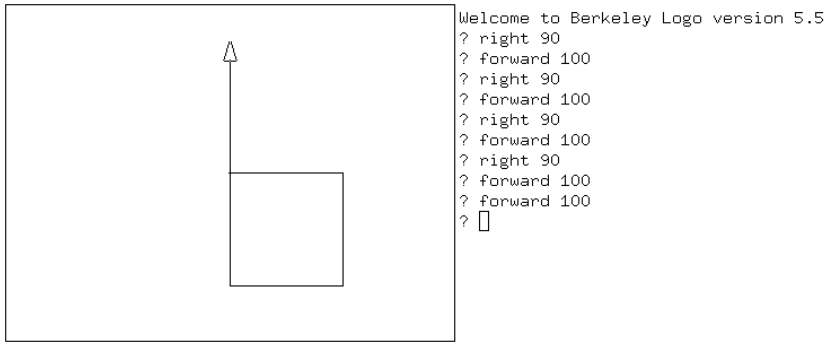


Figure 5.1. An example of commands and drawing from Papert's Logo programming language, an early precursor to Mathland. *Source:* Wikimedia Commons

as language learning has since been repeated by educational and technology experts a number of times over. For example, cognitive scientist Roger Schank makes a similar case in books like *Teaching Minds: How Cognitive Science Can Save Our Schools* (2011) and *Education Outrage* (2015). Schank presents naturally occurring, goal-based learning—what he refers to as "a cognitive process-based model"—as the savior for education.[7] It is no surprise that one of his favorite examples of this learning (alongside learning to walk) is learning to talk: "Let's start with walking and talking. Walking and talking are intrinsically rewarding. No kid needs encouragement to do either . . . they learn this quite naturally without very much parental help."[8] Schank continues, "In a cognitive process-based model of education, all teaching looks like the teaching you do when you teach your children to walk and talk," and school, he concludes "would seem like a natural and helpful experience."[9] Here again, types of learning for which we are genetically endowed—learning to walk and talk—stand in for all learning. The result is that learning that comes much less easily—for example, mastering the medium of text and writing—is rejected as unnecessarily arduous and artificial.

The ideas of "digital natives" and older "digital immigrants," originally developed by Marc Prensky, represent the third and final example of the paradigm of the spoken word serving as the basis for psychologies of learning. Prensky's ideas provide another example of how the naturalness of language learning is used as the paradigm for understanding education more broadly. But there is a twist: like Papert and Schank before him, Prensky draws a parallel between linguistic fluency on the one hand and fluency in new media and technologies on the other. But Prensky does not see early language learning simply as "*the* model of successful

learning" for just any age or subject. Instead, Prensky insists that when it comes to new technology—like computers, video games, and smart phones—this type of natural learning is the exclusive province of the young. And the best any older generation can do, he believes, is to learn (either figuratively or literally) with the halting and accented speech of an immigrant:

> Today's students—K through college—represent the first generations to grow up with this new technology. They have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age. What should we call these "new" students of today? Some refer to them as the N-(for Net)-gen or D-(for digital)-gen. But the most useful designation I have found for them is Digital Natives. Our students today are all "native speakers" of the digital language of computers, video games and the Internet.[10]

Prensky's argument has been repeated and reinterpreted, but also criticized, in a wide range of presentations and publications.[11] The argument privileges natural spoken language in that it sees learning this language as the model for learning new technologies. By way of contrast, it singles out teachers (and other adults) who are thought to have little or no fluency in this language as being the central challenge:

> The single biggest problem facing education today is that our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language. This is obvious to the Digital Natives—school often feels pretty much as if we've brought in a population of heavily accented, unintelligible foreigners to lecture them. They often can't understand what the Immigrants are saying. What does "dial" a number mean, anyway?[12]

Once again, the paradigm presented by the efficiency and "naturalness" of childhood language learning is front and center, marking the divide between those who are fluent in the language of new technology and those who are not. At the same time, Prensky ignores the skills and abilities of another medium that I believe we all approach as "immigrants" regardless of our age: reading and writing and the instructional practices and exercises associated with them.

The "simple and direct short circuit" that Kittler attributes to Pestalozzi's *Gertrude* can thus be seen as repeated by Prensky—and by Papert and Schank before him. Reading and writing are clearly a part of Papert's Mathland and are also

included in Schank's cognitive process-based model of education. They are arguably also an important part of Prensky's digital native technologies, which rely on googling, texting, and tweeting. But like Pestalozzi and other romantics before them, Papert, Schank, and Prensky sidestep and suppress the nature of writing and its acquisition. Like Gertrude, these recent reformers are not only repressing or short-circuiting the text, its nature, and its challenges, but are instead working to ignore the role of writing as the raison d'être of school and education.

Chomsky's New Chapter in the History of Rationalist Thought

As noted earlier, in the 1960s Noam Chomsky transformed psychology, philosophy, and even computer science by ushering in a new chapter in the rationalist tradition. Today, "cognitive science," based on the idea that the mind is in some way(s) computational in nature, forms the dominant account of mind and communication in the Anglo-American world. The human brain is now studied by "cognitive neuroscientists," and newer educational approaches, including constructivism, seek to embrace and extend the information-processing paradigm rather than to discard it. This enormous change started with Chomsky's theory of "universal" or "generative" grammar, or "transformational syntax." It was this theory that dealt the death blow to behaviorism—long the dominant psychological and educational paradigm in the twentieth century.

Chomsky, in short, ushered in a new psychology. And like any psychology, the central fact of this new cognitive psychology is again mediation. As with rationalism, the mediation, or medium in this case, is "the absolute privilege" ascribed to writing. Chomsky's notion of universal, generative, or transformational grammar has done much to build upon and update aspects of the rationalist tradition of Descartes, Galileo, and Comenius. Like Comenius, Chomsky sees his transformational grammar as a kind of elemental, natural, and universal language. On a "deep structural" level, according to Chomsky, all languages can ultimately be explained through this one language, grammar, or syntax. The language is "generative" in that through its combinations and "transformations" it engenders every existing (and possible) human language. Like Comenius's own "universal language," Chomsky's universal syntax runs "parallel with the course of *things*."[13] However, in the case of Chomsky, these are not the things of the world, but rather the things of the mind. Chomsky's grammar is based on the ways he believes we are universally hardwired to learn and use language. Chomsky imagines the existence of a specialized computational-language organ genetically programmed to operate based on the rules and structures of his

universal syntax. He describes this organ as a "built-in . . . information-processing (hypothesis-forming) system" that possesses "data-handling or 'hypothesis-formulating' ability of unknown character and complexity."[14] This imaginary but sophisticated computational device contains the rules that allow any human to master any preexisting language—from Aziri to Zulu—naturally in the first few years of life.

Following Descartes, Chomsky developed and verified his universal syntax by "test[ing] every proposition . . . about individual letters, words, or sentences [to] discover what can be deduced from them."[15] For Chomsky, this testing occurs by breaking down letters, words, and sentences to form what are now called "Chomsky trees." As shown in figure 5.2, these "trees" represent the dissection of a given statement, whether simple or complex, into its logical grammatical components (e.g., articles, nouns, verbs, etc.). From this dissection, according to Chomsky, it should be possible to work deductively to test and verify the underlying rules that govern the correct use of these components.

Chomsky's linguistics is clearly not based on the fleeting "cries" or "accents" of expression, emotion, or maternal love so celebrated by the romantics. Chomsky instead hypothesizes that language is a given set of visible components (letters, words, and phrases) that can be combined and recombined in an infinite variety of ways: "I will consider a language to be a set (finite or infinite) of sentences, each finite in length and constructed out of a finite set of elements . . . or symbols. . . . All natural languages in their spoken or written form are languages in this sense. . . . The fundamental aim in the linguistic analysis of a language . . . is to separate the grammatical sequences . . . from the ungrammatical sequences."[16]

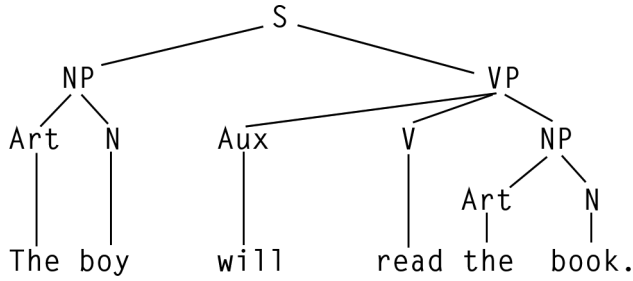


Figure 5.2. A Chomsky tree, mapping the hierarchical relations between the elements of a simple sentence. *Source:* Reconstructed from Fuki and Narita, "Merge," 7

What is important for Chomsky, in other words, is the structure of grammatical sequences that may be correctly or logically assembled from any language or set of elements or symbols. Just as important are the underlying computational and mathematical rules and structures that can be visually demonstrated to generate and govern the composition of these linguistic elements and sequences. But what does all of this mean for education and its media? The vast implications of Chomsky's theory are illustrated in small part in recent attempts to conceptualize learning in terms of multiple media. Richard E. Mayer's popular "multimedia learning theory"—highly influential in training, multimedia, and instructional design contexts—can be said to update the fundamental assumptions of Chomsky's view of mind for digital multimedia. Multimedia learning for Mayer boils down simply to "learning from words and pictures." Echoing Chomsky, Mayer proceeds from the premise that all forms of media represent different languages or "symbol systems" that require different mental transformations in order to be processed. Mayer adds his own twist, however. He sees the mind as a "dual-channel" device, like stereo speakers, that receives data through vision and hearing (one channel), as well as through text and speech (another channel).

Also, Mayer does not simply posit "data-handling or 'hypothesis-formulating' ability of unknown character and complexity" in the mind as Chomsky does. Instead, he theorizes that there are clear and knowable limits in our capacity as humans to process data. Based on these assumptions, Mayer outlines his (cognitive) theory of multimedia learning using the diagram in figure 5.3.

This diagram illustrates Mayer's theory that data follows dual channels on the path to becoming "knowledge." One path begins with pictures and proceeds through the eyes and initial processing to become a pictorial model. The other begins with words—whether written or spoken—that are then organized into a

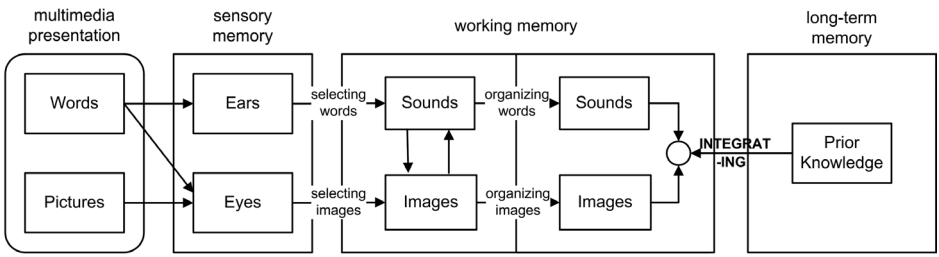


Figure 5.3. "Cognitive Theory of Multimedia Learning." *Source:* Adapted from Clark and Mayer, *E-Learning*, 36

verbal model. The ultimate point of "integration" of these channels with prior knowledge in working memory is crucial: this is where a special type of "organizing and integrating" activity occurs that Mayer, echoing Chomsky, refers to as "generative processing."[17]

It is also at this point that particular ways of presenting the data become important. If visual and audible data are received simultaneously, the argument goes, they can reinforce one another while avoiding unhelpful redundancies. The most efficient combinations, according to Mayer, are those that carefully balance words and pictures: "People learn better from words and pictures than from words alone."[18] These pictures and words, Mayer also finds, work better when they are organized together in segments and when interrelated words and pictures within these segments are kept together. Furthermore, essential words must be highlighted, and extraneous content must be excluded. Mayer presents these guidelines as "principles" of multimedia learning—as the results of cutting-edge empirical scientific research. However, these principles are almost all recognizably articulated and clearly embodied in Comenius's masterfully rationalist "multimedia" work with pictures and words from centuries earlier—his *Orbis Pictus* (see figure 3.1). That work presents words and pictures in close interconnection, using italics for key words, and organizes them in carefully segmented sections while excluding extraneous material. Present-day cognitive models and principles such as Mayer's can be seen as treading a well-worn path in the rationalist tradition. Mayer's ultimate concern, like that of Comenius, is simply "that sensual objects may be rightly presented to the senses, for fear they may not be received."[19]

Mediation as the Central Fact

Whether it is Mayer's effective reinterpretation of Comenius, or Dewey's and Papert's shared critique of classrooms and curricula, patterns are traced and retraced in discussions and debates about media and education over recent centuries. And underlying these patterns, I have shown, lurk deep-seated orientations regarding communication, language, and learning. I've focused on two of the most prominent of these orientations—the rationalist and the romantic—and I've shown how these traditions, with their long histories, have left undeniable traces in learning theories and educational psychologies today.

Each set of theories and psychologies begins from a different starting point regarding the most basic communication media—writing and speech. Rationalist

psychology affirms the "absolute privilege of writing" and ultimately takes the rules and structures of written language as its paradigm. The romantic position, by contrast, affirms the naturalness and expressiveness of speech and takes these characteristics as paradigmatic. The case for (and against) new media forms in education is often made by privileging one of these two opposed perspectives. Reformers and technologists still echo Rousseau and Pestalozzi when they argue, for example, that all learning should be as easy and natural as "learning to walk and talk." Others, following in the footsteps of Comenius, Descartes, and Chomsky, reason that the power of new media and technologies—from the printed book to the computer touchpad—lies in the similarity of their encodings to those of the human mind. They see technologies as ultimately capable of producing, as Comenius put it, a kind of "transcript . . . of the Notions innate in the mind." In ongoing work in the rationalist tradition, the goal is to match as closely as possible the encodings and operations of the mind with corresponding digital media and technologies—devices sometimes referred to as "cognitive tools," "mindtools," or "mindware." These computational devices, as well as the content they deliver, must be designed to work together as efficiently as possible with the processing of the mind—our own biological computational devices. As Richard Mayer has said, digital "learning environments" must be designed to "minimize extraneous cognitive processing, manage essential processing, and foster generative processing."[20]

The main points of each tradition, and the continuities that define each over the last few centuries, are summarized in table 5.1. The table not only indicates the main representatives and key understandings of each tradition; it also shows how each tradition is associated with different beliefs in the origin of language and the nature of the mind itself.

The rationalist tradition considers the written word (including the book and, later, computational encoding) as its paradigmatic or privileged medium. For the romantics, privileged status is given to spoken language and the natural contexts of its use. Underpinning the rationalist affirmation of structured and rule-bound encoding is its belief in the rationality of the world and the human mind that comprehends it. Either the world itself is a kind of book that can be reasonably deciphered or it is the mind and its specialized linguistic organ that has these rational qualities. Romanticism, on the other hand, looks to nature and natural processes to conclude that education as a whole should be equally "natural" in its essence.

Table 5.1 Overview of romantic and rationalist traditions in education and its media

	Rationalism	Romanticism
Privileged medium	Written word and the book; later, computational encoding	Speech and spontaneous expression with others present
Early representatives and view of learning/ teaching	René Descartes and J. A. Comenius: "Sensual objects [should] be rightly presented to the senses" via "a transcript . . . of the Notions innate in the mind"	J. H. Pestalozzi and J. J. Rousseau: "Education . . . [must] embrace a true comprehension of life itself" using "exercise[s] in correct and distinct articulation"
Origin of language	Pre-given rationality of the world or the mind	"Accents, cries, complaints"; the open expression of feeling
Status of writing vs. speech	"It is the primal nature of language to be written"	Writing is "only an artificial sort of speech"
Current figures, view of learning/ teaching today	Noam Chomsky and Richard Mayer: "Learning environments . . . minimize extraneous cognitive processing, manage essential processing, and foster generative processing"	Seymour Papert, Roger Schank, and Marc Prensky: "The model of successful learning is the way a child learns to talk"; "instructors . . . are struggling to teach a population that speaks an entirely new language"

By outlining these two ways of thinking, I do not mean to suggest that they are the only two possibilities for understanding speaking, writing, and other learning with media.[21] In describing the two traditions—from their echoes in mythology to their most recent incarnations—I argue that neither really tells the whole story. Writing never simply amounts to an artificial sort of speech, and speech is never simply a particular type of rational "encoding." Even the most romantic educator ultimately relies on books and writing, and the most rationalist theorist struggles to explain the chaotic spontaneity and variety of human language.

The story of these two most elemental forms of communication, the spoken and the written, is not about one dominating or entirely replacing the other. Speech cannot be explained entirely in terms of kinds of writing and codification, and writing cannot be dismissed simply as an artificial form of speech. Instead, these two most basic communicative forms, despite their very different characteristics, are always inseparably intertwined—especially in instruction. They exist in a profound and complex symbiosis. Key instructional methods and forms, as I will show, are based on their careful combination. My case studies of the lecture and the textbook illustrate how these forms have evolved and been reinvented constantly over time by bringing writing and speech into new and relevant interrelationships.

For example, one of these two elemental forms is sometimes simulated in or through the other. Aspects of carefully prepared writing are often reproduced in speech, such as rehearsed public lectures or TED Talks. At the same time, the spoken word is sometimes simulated or provoked in the form of self-explanations and prompts carefully integrated into the design of textbooks and related instructional material. But before considering the lecture and the textbook, we will look further at the character of natural spoken and other media, and we will consider how important they have been—and still are—in our conceptions of knowledge and its generation and regeneration through education.

Chapter Six

Theorizing Media—by the Book

> For 2500 years, the philosophers of the Western world have excluded . . . techne [sic] from [their] meditations.
>
> —MARSHALL MCLUHAN, 1972

Marshall McLuhan, once seen as potentially "the most important thinker since Newton, Darwin, Freud, Einstein, and Pavlov"[1] is regarded rather differently today. McLuhan has been forgotten and neglected not once, but twice. The first time was after his meteoric rise in the sixties—the decade when journalist Tom Wolfe compared him to some of the world's greatest scientists and asked breathlessly, "What if he's *right*?" McLuhan was interviewed in *Playboy* magazine and even appeared briefly (playing himself) in Woody Allen's 1977 movie, *Annie Hall*. Almost two decades of obscurity followed. But in 1996, *Wired* magazine posthumously canonized McLuhan as "the patron saint of the Internet," and reissued one of his most popular books, *The Medium Is the Massage* (a play on his famous dictum "the medium is the message"). But after the dot-com bubble burst, popular interest in McLuhan again subsided, and he never regained the currency that so excited scholars and the public almost 50 years earlier.

Nevertheless, McLuhan's statement about philosophy's 2,500-year exclusion of *techne* remains. And in this context we can ask again: What if he's *right*? McLuhan uses the Greek word *techne*—often translated as "craftsmanship," "craft," or "art"—to refer generally to the "human imitation of nature." Unsurprisingly, McLuhan is much more interested in the "medium" of such art (e.g., marble or papyrus and ink) than its content or "message." His point is that the technical "medium" has been ignored for 2,500 years and that it should now become the focus, the message. In what follows, I briefly show how McLuhan

was indeed right—at least regarding media and the history of philosophy. I look in particular at the example of the book as a medium and consider what changes in this form mean for understanding media and education today—and for *this* book as well.

Scholars of media who have scoured the history of Western philosophy have found surprisingly little about "the medium." Of course, there are examples, like Søren Kierkegaard's harsh attacks on the newspaper as a mass medium, or Theodore Adorno's philosophical critiques of radio and popular music. But these examples represent more a denunciation of inauthenticity or the domination of the masses than an attempt to theorize media per se. For his part, Socrates certainly condemns writing in favor of speech (see chapter 3), and Aristotle later comments briefly on different media of imitation in his *Poetics*. But after that short commentary, as one theorist recently noted, Aristotle set "the question of medium aside, *where it remained for two millennia*."[2]

Theorizing Media: Missed Opportunities and Exceptions

When it comes to theorizing media, there are many examples of missed opportunities but also some "exceptions that prove the rule"—examples of theorizing remarkable by their scarcity. For example, there's the missed opportunity represented by Michel Foucault (1926–1984), the philosopher and historian of the *longue durée* that is central to this book. Almost without exception, Foucault carefully avoids discussion of contemporary media in his work; he concerns himself only with written "discourse" in general and the ways that power and knowledge are shaped historically in and through it. Indeed, as Kittler once observed, "All [of Foucault's] . . . analyses end immediately before that point in time at which other media penetrated the library's stacks."[3] Foucault even insists at one point on his lack of interest in all things McLuhan: "I am not saying that writing would have to be replaced by other communication media not dependent on letters. This is not about McLuhan."[4] Foucault, in other words, has no need to consider whether the *medium* of written discourse might also be part of its *message*.

Even further back, Friedrich Nietzsche (1844–1900) provides a small but meaningful exception. Nietzsche once famously declared that "what doesn't kill me makes me stronger."[5] Ironically, Nietzsche himself was long wracked by illness and failing eyesight, so in order to continue his work he experimented briefly with what was then a brand-new media technology: the typewriter. The model he used was a Danish "Malling-Hansen Writing Ball" (figure 6.1).

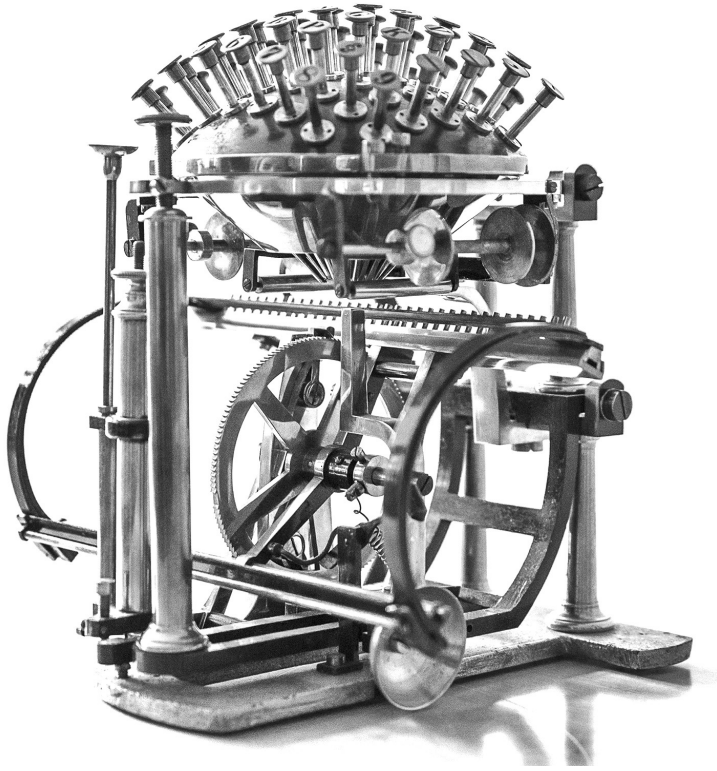


Figure 6.1. A writing ball of the kind used by Nietzsche. A curved metal plate (not shown) holds the paper in place beneath the "writing ball" keys. *Source:* Wikimedia Commons, photo by Pavel Eremeev

The typewriter could write only in capital letters, and it was plagued by mechanical problems. Regardless, a "typescript" survives from 1882 that contains the following: "OUR WRITING TOOLS ARE WORKING WITH US ON OUR THOUGHTS."[6] This bold statement has been understood variously. For example, it is sometimes suggested that the writing ball is responsible for the aphoristic work Nietzsche produced during this period, including not just the quoted statement but also his famous claim that "God is dead." However, Nietzsche produced remarkable aphorisms both before and after 1882; indeed, he was a rare master of the form. Much more important is how writing tools affect us in the long run, how the medium imperceptibly shapes the message, and how it works "with us" in our thinking and on our thoughts.

An earlier example, another small exception to the rule, is provided by John Milton, another contemporary of Comenius and Descartes during the eminently rationalist and book-loving 1600s. Milton was an author, a poet, and a public intellectual. In a speech to the British Parliament on censorship and freedom of expression, Milton eloquently "theorizes" on the book as a medium: "Books are not absolutely dead things, but do contain a potency of life in them to be as active as that soul was whose progeny they are; nay, they do preserve as in a vial the purest efficacy and extraction of that living intellect that bred them. . . . Who kills a man kills a reasonable creature, God's image; but he who destroys a good book, kills reason itself, kills the image of God, as it were in the eye."[7]

On the one hand, the book for Milton is something material: a preserving container, a vial. In this limited sense, books are indeed inanimate or "dead things." But they are also much more: they hold "a potency of life," which is "as active as that soul was whose progeny they are." The book, in other words, brings together two dimensions: the physical, material reality of the medium and the living world of ideas and events the medium can contain. So the book, like its living human author, is both physical "container" and active mental "content," a familiar combination of flesh and spirit, body and soul.

Milton, however, claims that the book has a purity that goes beyond that of its human creators. The "soul" of the book, Milton says, is "the purest efficacy and extraction of that living intellect that bred them." The book offers not only a refined distillation of the thoughts of its author, but is also marked by a certain perverse perfection. The printed book was the first mass-produced item, and therefore any one example of the item was identical to any other. Early observers of the printed book were said to have marveled at "the exact agreement of every book, one with another, that every line stood in the same place, every page a like number of lines, every line a like number of words." Even minor errors were reproduced unfailingly. Indeed, this perfection was said to have struck some as the result of a divine or even diabolical power.[8]

These examples from Milton and Nietzsche offer much food for thought, although, to my knowledge, they have not been highlighted together this way before. Despite some brief and brilliant exceptions (and I consider a few more below), more sustained attempts to address the question of media and mediation have begun only very recently in philosophy and theory. As the example of John Dewey suggests, these attempts started very slowly as the twentieth century approached. This was a time when electromechanical media technologies—the steam-powered rotary press, the telegraph, and typewriter—began interrupting the *vita contempla-*

tiva of thinkers and philosophers. If the example of Foucault is any indication, though, this progress has been slow and inconsistent at best. Other examples of these exceptions include the work of Canadian Harold Innis on writing and empire, the German Walter Benjamin on radio, film, and fascism, and, of course, Marshall McLuhan's concern with the medium as the message. But the idea of theorizing media in a careful and systematic way still remains largely foreign to most philosophy and theorizing.

So why have media—including writing, printing, and digital forms—been ignored for so long? What could explain the conspicuous, multi-millennial absence of media and mediation in philosophy? A likely answer is the tendency of media themselves to cultivate a kind of "disappearing act," for their success to be seen as "thriving on their own disappearance," as Sybille Krämer, a rare philosopher of media, has put it: "In their everyday use, media enable messages to emerge and to be present, while the media themselves remain hidden. . . . This explains phenomena with which we are all familiar: We do not hear vibrations in the air, but rather the kettle whistling . . . we do not hear a CD, but rather music; and the cinema screen 'disappears' as soon as the film grips us."[9] A memorable article, song, or movie does not leave one thinking about the (Web) pages on which it appears or the radio or screen on which it is played. The success of these media—print, the Web, radio, and video—is based precisely on their becoming invisible as a medium while conjuring the illusion of the immediacy of the content being delivered: "The more effectively media function, the more they remain below the threshold of perception. At the same time [as] media bring something forth, they themselves recede into the background. And vice versa: only noise, dysfunction and disturbance make the medium itself noticeable."[10]

McLuhan, for example, explained that because we place "all the stress on content and practically none on the medium, we lose all chance of perceiving and influencing the impact of new technologies. . . . [T]hus we are always dumbfounded by—and unprepared for—the . . . environmental transformations induced by new media."[11] The effects of this dumbfoundedness are apparent not only when we are enjoying music or a movie, but, as McLuhan suggests, when we try to understand media and their meaning in and for theory and philosophy.

Wait a Minute, Mr. Postman![12]

So how can this forgetting and dumbfounding be avoided and counteracted? Before we address this question, consider how McLuhan—and media critic Neil Postman—understood these effects and their dynamics. Postman, who once

described himself as a "child" of McLuhan,[13] reserved particular attention for the dumbfounding effects specifically of television. He explains that the problem with this particular medium is not its overt content—which was and remains primarily "entertainment"—but the message it brings: "[W]hat I am claiming here is that it has made entertainment itself the natural format for the representation of all experience. . . . The problem is not that television presents us with entertaining subject matter but that all subject matter is presented as entertaining, which is another issue altogether."[14]

By framing everything—from history to public news and political debate—as entertainment, television provides an especially powerful example of how media dumbfound us and then disappear from our awareness. However, the conclusions that Postman arrived at were quite different from those developed by McLuhan. As noted in chapter 1, McLuhan celebrated the possibility that TV (along with "press-magazines-film-radio") might crack classroom walls and "destroy the monopoly of the book." He understood his own century in terms of "the encounter between alphabetic and electronic forces," and at one point, he gleefully predicted the imminent arrival of an intimately networked "new society," which he described in the most effusive terms, describing its "mythic integration, a resonating world akin to the old tribal echo chamber where magic will live again."[15]

To say that Postman was more pessimistic about electronic media is an understatement. Faced by the contemporary rise of "the Age of Television," he lamented the decline of "the Age of Typography." Postman saw in television "the clear possibility" of what he called "culture-death."[16] "Culture" for Postman is above all print culture, specifically the culture of the Enlightenment, which is acquired, he believed, through formal schooling. It is a culture, moreover, that puts "forward a definition of intelligence that gave priority to the objective, rational use of mind."[17] If he had his way, Postman would desperately reinforce the walls of the classroom as a protected space for print culture, rather than see them crack and come tumbling down.

Despite McLuhan's hopeful optimism and Postman's apocalyptic pessimism, there is more than one point on which they agree. Both see the arrival of writing and print—and later of radio and TV—as making (and breaking) entire epochs. McLuhan characterized these as the "Gutenberg" and the "Marconi Galaxies;"[18] for Postman, these are the cultural life of the Age of Reason (and the founding of the American republic) on the one hand, and the culture-death of pure entertainment and unreason on the other. For both thinkers, each medium brings

with it a particular mode of thought, even a whole new form of (false) consciousness and (mis)apprehension of self and world.

Decades after McLuhan's glowing predictions and Postman's gloomy lamentations, it is clear that we have witnessed neither the complete death nor the mythic reintegration of culture. One configuration of media, thought, and consciousness—whether determined entirely by writing and print or by TV and electronic media—has not suddenly and secretly been replaced by another. If anything, the rise of the Internet as a popular phenomenon—postdating McLuhan and dismissed early on by Postman[19]—has blurred these distinctions among media and rendered their epochs more confused. The Internet and the Web, after all, are about new mixtures of media—text, spoken word, and electronic televisuality—rather than any single, radically new form. Indeed, both computer scientists and media theorists have said that this kind of convergence has made computer technology into a "metamedium": the notion that "the computer, viewed as a medium itself, *can be all other media*."[20]

A second important point from which McLuhan and Postman both begin—before they arrive at conspicuously counterpoised conclusions—is that both saw one monumental, epochal rivalry, a "great divide" underlying all others in the world of media. McLuhan describes this in terms of the rivalry of "oral and tribal ear-culture" versus "heavy visual stress" of "abstract[ly] intellectual" writing and print.[21] Postman, for his part, refers to the "gregariousness and openness" of orality, seeing its polar opposite as the "introspection and isolation fostered by the printed word."[22] Others have described this tectonic, mediatic fault line in terms of the opposition of "orality" and "literacy." Whatever the language used to describe the terms, the inclusive, integrative world of sound and speech is seen as one that is at odds with the isolating and abstract detachment of writing and print. Residual traces of orality—for example, our preference for sonority in poetry, or reading aloud for comprehension—may still be detectable within our abstract culture of language. But print and writing are often seen as wiping out these traces, gradually but inexorably. At the same time, new audio and televisual technologies are seen as gradually ushering in the return of oral ways of working in what has been called "secondary orality." This development can be seen as an alternate name for McLuhan's "new society" of "mythic integration" or Postman's televisual "culture-death."

This book, like many recent studies of speech and text, sees the relationship of these two fundamental media quite differently. The relationship is much more one of mutual interdependence than of mutual exclusion, based on research that

includes not only investigations of allegedly oral and literate cultures,[23] but also of education and literacy acquisition. For example, literacy expert Brian Stock emphasizes that in the "reality of social" communications, it is clear that "oral and literate modes are 'mixed' in each society." The general cultural trend over time, according to Stock, is "not so much from oral *to* written as from an earlier state, predominantly oral, to various combinations of oral *and* written."[24] These various combinations of oral and written language are particularly obvious in the classroom, as literacy education specialist David Barton (see chapter 2) emphasizes: "In examining the uses of literacy in the classroom, the first point to make is that . . . literacy practices are totally bound up with oral language. In all sorts of literacy events, texts are talked about, whether they are books, worksheets, student writing, written tests. Much of schooling can be characterized as *talk around texts*. . . . Schooling is about text-based meanings, yet spoken language is of great importance."[25]

Accordingly, in this book, writing and speech, printed text and spoken word, are not seen as mortal enemies or polar opposites; nor are they associated with different types or levels of intelligence or consciousness. As discussed in the previous chapter, these two modes of media are instead regarded as the closest of companions, intimately intertwined, and mutually supporting and influencing. Although one might be idealized—held up as the model communication—to the exclusion of the other, it is impossible to imagine either of them in complete isolation. And as the quote from Barton indicates, their close interconnection is perhaps nowhere more evident, varied, and routinized than in education. The longest-lasting pedagogical practices and techniques, from dictation through textual recitation, from reading-by-phonics to lecture notes and textbook prompts, all rely on the intimate interaction of the spoken and written, as well as the simulation of the one through the other. And as I show in my examination of the history of the lecture and the textbook, the arrival of new technologies results in the reconfiguration rather than the elimination of any of these oral or textual elements.

So in looking at ways that media may dumbfound and deceive us, it is important that we not be distracted by ways of thinking about them that have been shown to be misleading. I believe that the dumbfounding effects of media can be effectively counteracted by reconstructing some of the other—often older—ways of understanding and theorizing media. Despite the epochal exclusion of media from the meditations of philosophy, there are many non-philosophical asides and offhand remarks by philosophers about print, books, spoken words, and other

forms. These comments can be said to arise almost involuntarily, like a neurotic impulse or a Freudian slip (a remark that says much more about what is not being said). Consider, for example, rationalist observations about the book of nature, or Comenius's plan for a "universal book" for pansophic education. These say at least as much about a kind of rationalist faith in writing and the book as they do about nature or education. As I've shown, the conceptions of reading, writing, and other media implicit in visions and ideas from the seventeenth century to our own time all reflect powerful but unspoken value judgments or biases regarding media. And it is possible to learn a great deal from these barely hidden biases and judgments.

Media Theory *avant la lettre*

Given that the explicit theorization of media in philosophy has only begun, however haltingly, in the last few decades, it is clear that whatever else may be available must be articulated outside of or before (*avant*) the existence of media theory as a name or idea (*lettre*). To uncover such theory means to read between the lines, to look for what is being said only parenthetically, even as if in error. It also means that we should not be absorbed entirely in the overt content—for example, in Pestalozzi's passionate enthusiasm, or Comenius's faith and optimism, or even in Mayer's scientific principles—but should look for what is not being said, the proverbial elephant in the room.

In the remainder of this chapter, I argue that the physical book—a media form whose dominance was once unquestioned but is gradually and indisputably eroding—has long shaped how we think about knowledge, its validation, acquisition, and circulation. This gradual erosion means more than just a challenge to libraries, bookstores, and publishers; in fact it is a challenge to how we have understood and evaluated what we know and how we have come to know it. For example, the book is no longer regarded as the single and emblematic source from which knowledge rains to the earth, as depicted in figure 6.2. The nature of the book and what it has meant provide insight into our conception of knowledge and its validity and truth.

I begin by examining how the book has been theorized as a medium *avant la lettre*, specifically in the context of British Empiricism, a philosophical tradition that, like romanticism, was developed as a response to the rationalism of Comenius, Descartes, and others in the seventeenth century. However, unlike romanticism, empiricism does not emphasize passion, but rather aims to rid human knowledge of superstition by focusing on experience, or careful empirical

Figure 6.2. Media theorizing *avant la lettre* c. 1610. Knowledge falls to the earth like rain from a book, its ultimate source. Very little knowledge is collected in the memory, which is depicted as a "bulbous flask with a narrow neck." The Latin motto states, "The greatest part of memory is lost," and further explanation (cropped out of this illustration) is provided: "The . . . flask takes in only very little of the plentiful rainwater falling on it. Similarly, our memory, if it is not already weak or in error, becomes feeble if we do not exercise it. We forget what we read and what we learn by heart as soon as we turn away from it."
Source: Horozco, *Emblemas*

observation. In this context, the book is used as a kind of unconscious test case for verifying and illustrating philosophical propositions about knowledge, truth, and certainty. It is, in other words, an epistemic object or metaphor,[26] and as such, it is something that serves as the basis of what Foucault identified as an *episteme*, a way of knowing, of understanding and verifying reality and truth. The empiricists' use of the book as an example illustrates the importance of what I refer to as "book culture," even offering a paradigm for the way we have understood knowledge and its characteristics, including their role in teaching and learning.

Consider the book you are now reading. Your attention is almost certainly focused on its content, rather than on the form of the book. Are even-numbered pages on the right or the left? On which side, recto or verso, right or left, is the

title page to be found? What kind of binding is used: "case" (with groups of folded pages), "perfect" (page edges glued to the spine), or something else altogether? Even in answering these basic questions about the book's material organization, it would be easy to conclude that the book is essentially a simple arrangement for presenting textual information. It has printed pages fixed together on one side, organized unambiguously according to chapter, paragraph, and page, and protected by a cover wrapped around the spine. In this sense, and in today's technological vocabulary, the book presents a number of "affordances." It affords, or enables, private reading, of course, but it also enables highlighting, dog-earing, and both random and sequential access (by turning or flipping pages). However, these are only its physical, material characteristics.

My point in looking at the book in empirical philosophy is not so much to examine its conventions, parts, and assembly. My point is instead to ask, with Nietzsche: How is this reading "tool" also working with us on our thoughts? Or more grandly, as media theorist Kittler puts it: "What does it mean for the Western *episteme* that the book *is* its concrete form?"[27] What, in other words, does it mean that the book is in a sense the embodiment of Western knowledge? As a corollary: What does it mean that the romantic rejection of the book also implies a broader rejection of this mediated knowledge—and an affirmation of the immediacy of feeling?

The very power of the book's embodiment of this knowledge presents a challenge, however. The significance of the book in empiricism provides an idea about the meaning of the book in our thinking and Western ways of knowing more broadly. The influence of the book is so broad and so powerful that it can be said to significantly shape our culture and define, in this broader context, what can be regarded as efficient and functional in itself.

The Book as Cultural Paradigm

Empiricism, first of all, is grounded in the belief that ideas and knowledge are developed only through the senses and experience. The mind, empiricists believe, does not come equipped with Platonic ideas or a kind of Chomskian language device (see chapter 5). Instead, empiricists regard the mind as a tabula rasa, a blank slate, or, as philosopher John Locke (1632–1702) writes in his *Essay Concerning Human Understanding* (1689), "a white paper, void of all characters, without any ideas."[28] Even here, empiricism is using media—specifically the media of paper, writing, and printing—to make its point. What could be more devoid of content or ideas than a blank sheet of paper—an artifact whose ultimate purpose

is to be written upon, to bear characters and ideas? Although the idea is expressed only tacitly, Locke is pointing to something that, as Milton also noted, makes both the written or printed page and the mind different from almost all other objects: They both have a certain "potency of life," the ability to contain and communicate ideas. Even today, the phrase "tabula rasa" is philosophical shorthand for a view of the human mind as starting off as a blank slate, without innate ideas, structures, and patterns that it otherwise so quickly acquires.[29]

In his *Essay* Locke considers the medium of the book in a similar way. He imagines a traveler, someone who had never seen a book, being introduced to the object and being "told that all learned books consisted of paper and letters, and that letters were things inhering in paper, and paper a thing that held forth letters: a notable way of having clear ideas of letters and paper!"[30] Locke implies that the truth of this description—and the obvious nature of the book and its parts—is so self-evident that such an innocent stranger would likely "think himself mocked, instead of taught." Sadly, Locke admits, few other ideas are so obviously self-evident and clear-cut as those regarding the book.

In referencing both the book and the blank piece of paper in these ways, Locke is using media metaphors specifically to describe how knowledge works. He sees the characteristics of these media—the virgin whiteness of the page and the internal organization of the book—as the basis for addressing ideas, such as how written or printed characters can fill a page or be self-evidently organized in a book. Although his focus as a philosopher is not on books or pages, but on understanding knowledge and truth, Locke can be said to be unwittingly theorizing media *avant la lettre*. Even while he is not speaking specifically about media, the elephant in the room for philosophy, he is saying that the white page is a holder not just of characters but of ideas. And he is also saying that the organization of letters and paper in a book is so self-evident that it can serve as a "notable way of having clear ideas." But if these statements are indeed akin to an unconscious impulse, a Freudian slip, then what is Locke actually saying about characters, pages, and ideas?

To find out, I move on to the reply of George Berkeley (1685–1753), one of Locke's most famous critics. In his dialogues between "Hylas" and "Philonous," Berkeley also uses the book as an example for understanding truth and knowledge, but he focuses much more explicitly on its dual nature as described by Milton—its simultaneous character as a physical container and the "potency of life" that forms its content: "In reading a book, what I immediately perceive are the letters; but mediately, or by means of these, are suggested to my mind the

notions of God, virtue, truth, &c. Now, that the letters are truly sensible things, or perceived by sense, there is no doubt: but I would know whether you take the things suggested by them to be so too."[31]

Berkeley is asking whether the notions in a book are as real as its words and letters. His eminently empiricist answer is an unsurprising and unqualified no. For empiricism, ideas like God, virtue, and truth do not have the same status as the self-evident physical reality of the book as an object. Deities and high ideals are more like superstitions that empiricism wished to banish from philosophy than the sensory immediacy, espoused by empiricists, of letters on a page. At the same time, in looking at the book as the interface for these two different realities—the physical and the mental or ideational—Berkeley puts his finger, however briefly, on the dumbfounding effects of the book and other media. He shows their power to transform the immediate perception of material letters on a page (or dots on a screen) "mediately" into ideas like God, virtue, and almost anything else one might imagine. It is this transformative potential, this capability to act as an interface between physical and mental, that helps to explain the power of Locke's metaphors. The blank page and the book are effective as metaphors for the mind and its ideas because, like the mind, they can receive words and ideas and retain and organize them.

For Berkeley and Locke, and for traditional empiricist thought more broadly, the book thus has a special status. As a conventionalized, interchangeable, and self-contained "thing," it is first of all an ideal object for empirical observation. But given the ideas it contains, the book communicates to the reader all manner of possibilities that the empiricists saw as precisely the opposite of clear and indubitable perception and experience. Thus, while they are happy to use the example of the physical book as an object of experience, the empiricists are conflicted if not outright suspicious when it comes to its contents—the ideas, notions, and even superstitions it contains.

American psychologist William James (1842–1910) provides yet another reference to the book in his own empirical philosophy, an approach he referred to as "radical empiricism." James's belief is that experience is a kind of generalized "flux of life," something neither entirely mental nor material. Despite such a drastic departure from traditional empiricist conceptions of experience and the mind, the book returns in James's writing. And like his empiricist forebears, James uses the book as a kind of test case for knowledge and certainty: "The book here lying on the table before me, and the book in the next room of which I think and which I mean to get, are both in the same sense given realities for me,

realities which I acknowledge and of which I take account. . . . The object of which I think . . . occupies its definite place in the outer world as much as does the object which I directly see."[32] James is not interested in the content of the book but in the self-evident clarity of its form. One book is as real as another for James, whether it is conceived in the mind or occupies a place in the outside world. In using the book as a touchstone for judgments about thought and reality James is rejecting the long-held empiricist privileging of objective experience and its simultaneous suspicion of mere notions and ideas in the mind. But like Locke's and Berkeley's earlier references to the book, James's reflection ends almost as soon as it begins.

But James can also be seen as highlighting a particular quality of the book as a form that is only latent in earlier empiricist references—that is the way the book unifies its sometimes-contradictory physical and spiritual dimensions in a single, self-contained physical identity. This unification most frequently occurs under the authority of the book's author, but it can also occur under the aegis of its title, or under a widely acknowledged, established purpose. The Bible, *The Oxford Shakespeare*, *Gray's Anatomy*, *The Elements of Style*, and *Webster's Dictionary* are each representative of a publicly acknowledged purpose, author, or reputation. Each can sit on a shelf in unambiguous sequence together with other books with equally representative titles. Names like Oxford, Gray's, and Webster's all imply a history, identity, reputation, or authority that is generally taken as self-evident. Thinking back to William James's example, any of these texts can also be imagined as a whole in the mind—unlike, for example, a particular recitation of the Veda or the successive scrolling lines of a Web page or software program.

The book in this sense marks not only the intersection of the immaterial and material dimensions noted by Milton; it is also the place where the author and reader meet and engage in myriad literal and figurative ways. A book can at once embody the essence of being Shakespeare, for example, offering abstractly and universally the text of *Hamlet*, as well as being a concrete physical copy that is mine alone. This remarkable combination of physical integrity along with cultural, intellectual, and historical identity enables the book to serve as a key example for speculation for James, Berkeley, Locke, Milton, and others.

All of these characteristics of the book as a cultural paradigm are thrown into sharper relief as competing qualities of the Web and digital media become ever more ingrained in our experience. For example, the book is closed and determinate, discrete and self-contained; its character is particularly obvious when com-

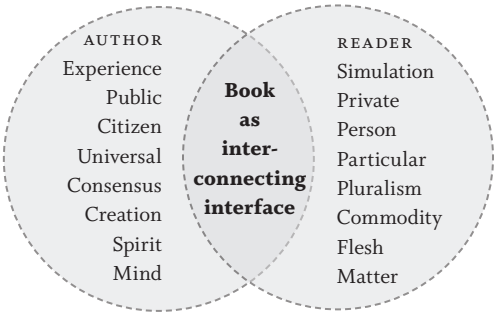
pared with the highly variable textual content of a given Web page or even an e-book. Marcel Proust's multi-volume *Remembrance of Things Past* fits as neatly on an e-reader as a short story by Ernest Hemingway. With its neatly bound pages, its fitted covers, and its heft, the book by its very nature signals a clearly demarcated beginning and ending, indicating at a glance the amount of text lying within it. The printed book contains within its covers all that its reader would seek. It is not a one-off collection of search results, ads, and links that might lead to still further images, links, and pages. Moreover, unlike most information on the Web, the book achieves this feat in a manner that is absolutely stable and unchanging from one copy, place, and time to another.

The Book as Interconnecting Interface

The world of computer screens and circuitry has given us a term that is helpful in understanding the role of the book in our culture: "interface," defined by the *OED* as "a means or place of interaction between two systems, organizations, etc.; a meeting-point or common ground." As French National Librarian Patrick Bazin puts it, the book as an interface brings together not only author and reader and mind and matter, but also public and private, particular and universal, in an especially powerful combination: "The circuit of the book in the form it has eventually taken . . . regulates the subtle dialectic between particular and universal, consensus and pluralism, private reader and citizen . . . the book sets the stage for a trilogy—author, book, reader—based on the separation of roles and a stability: on the one hand, the author, on the other, the reader, each exchanging their singularities through the stable, reliable, and public "interface" of the book."[33] The book is an interface between a range of systems, organizations, and oppositions that we understand as structuring our everyday world: public versus private, or personal experience and belief (i.e., the particular and private) versus what is generally known and believed (i.e., the consensual, general, and public). Further examples of the book as interface are illustrated in table 6.1.

As Bazin puts it, the book provides the means for author and reader to "exchange their singularities"—to swap what is unique and distinct to both, either literally or figuratively. Consider that first a book is bought and sold, changing from being an object on a bookstore shelf—theoretically available to everyone and anyone—to becoming something that is mine, something that I curl up with on the sofa. By making it mine, I as a reader gain access to the creativity, the experience, the thought, and the feeling of the book's author. Paradoxically, as the word "publication" suggests, the author's act of putting these singularities into a

Table 6.1 The book as interface



book gives them a public life, making them, in theory at least, accessible to all. In so doing, the author has also stepped out of her role as a private person and into the role of public figure. Her picture is on the dust jacket, her biography appears on Amazon, and her full name and birth date are recorded in library catalogs around the world. In this sense, the words, lines, pages, and chapters of the book can be said to have a certain universality, something that is not a matter for dispute but of self-evident consensus, something emphasized in Locke's description. What the author has experienced or felt (or at least wanted to communicate) can be said to be comprehended, experienced, or felt by the reader—even if only approximately, indirectly, or vicariously. What the author has thus made a matter of public record becomes a part of the reader's private thoughts and individual particularity. Finally, the fact that the various functions of the interface of the book almost always operate surreptitiously, below the level of the reader's or author's (or philosopher's or theorist's) awareness, allows this paradigmatic medium to work covertly, and thus all the more powerfully, on thinking, reflection, and learning.

Bazin concludes that for the West the book represents "a total operating system of demarcations and mediations." The book, in other words, serves as the "fundamental constraint [that] structures modernity's mental space: the one which prescribes that text within the book be linear and, especially, that it have a beginning and end. By means of this simple systematic devising, an entire logic and—one could say—epistemology of exposition and demonstration is put into effect."[34] Clearly the book—accessible, self-evident, and self-contained—has provided a kind of logic or epistemology of exposition and demonstration for the empiri-

cists. Further, by negative implication, the epistemology of the book provides something similar for the romantics: a distillation, maybe even a caricature, of the abstract Western rationalism that was their mortal enemy.[35]

This epistemology has also found its way into everyday language: we still speak today of being an "open book," of "hitting the books," of going "by the book" (as in the title of this chapter), and even of "being on the same page" (presumably also in a book). We may try "every trick in the book," avoid "judging a book by its cover," or hope to get into someone's "good books." All of these expressions speak, in various ways, to the easy accessibility of what is in a book, to its comprehensive nature, to the sometimes pedantic or historic authority of this form, and again, to its beguiling dual nature as container (with a cover) and content (the "book," which might be misjudged).

In the next chapter, I look at a specific genre of book, the textbook, a type of book specifically instructional or educational in its composition and design. I show that the textbook, like the book in general, is much more than just a stack of pages bound between two covers. It too is a vial, as Milton remarked, that "contains a certain potency of life" in which the reader can partake. But in the case of the textbook, this is typically not the life, the experience, the ideas, or the authority of a single author; instead, its experience is largely pedagogical or instructional, experience in which student readers can participate above all through learning and study.

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PART III / The Textbook and the Lecture

Re-forming the Book and Performing the Text

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Chapter Seven

A Textbook Case

> The concept of science drawn from [textbooks] . . . is no more likely to fit the enterprise that produced them than an image of a national culture drawn from a tourist brochure. –THOMAS KUHN, 1962

Thomas Kuhn, physicist and historian of science who famously coined the phrase "paradigm shift," does not mince words when it comes to the textbook. Textbooks, he says, show us only the most clichéd sites and local color of the expansive terrain of science. Kuhn is not alone in sounding impatient or dismissive about textbooks. John Dewey, Ivan Illich, and Marshall McLuhan, to take just a few familiar examples, were similarly critical. Dewey denounced the "text-book fetich [sic]" of the university classroom of his day; Ivan Illich decried the "textbook racket" of commercialized schooling. And finally, Marshall McLuhan, as noted in the opening chapter of this book, happily predicted the destruction of "the monopoly of the book as a teaching aid."

But Kuhn is different. He did not unambiguously denounce the textbook in his famous *Structure of Scientific Revolutions* or elsewhere. In fact, he wrote favorably of how the "pedagogic form" of the textbook has done more "than any other single aspect of science" to determine "our image of the nature of science and of the role of discovery and invention in its advance."[1] In the final analysis, Kuhn saw the textbook as indispensable. He believed that its clichéd descriptions and "recurrent and quasi-standard illustrations" all play a key role in the development and reinforcement of the scientific paradigm and in moments of paradigm shift or transformation. In this chapter, I also argue that the textbook—whether in traditional print or digital e-book form—is essential in education more broadly. I examine the long history of the textbook as a pedagogical form and the multiple

meanings and functions it has acquired (and also lost) along the way. I suggest how the textbook, like the lecture and the book itself, ultimately functions as a middle point that joins not only new innovations in media and their use, but also the fundamental elements of authors and readers, experts and novices.

But first I turn briefly to Kuhn's *Structure of Scientific Revolutions* and the paradigm shift. Kuhn had almost finished his PhD degree in physics at Harvard University when he started to study the history of his field. He began to concern himself not so much with the latest findings but rather with what he called "out-of-date scientific theory and practice."[2] Among the most out-of-date theories in his field were those of Aristotle's *Physics*. Although those theories originated in around 300 BCE, it took until the seventeenth century (and the developments of the scientific revolution) for them to be proven wrong. For example, Aristotle believed that there were four essential elements—earth, air, fire, and water—and that each has its place in nature. He hypothesized that a rock falls to the earth and a flame flies into the air simply because each seeks its original "home"—either with the other rocks on the ground or with the sun and stars in the sky.

But how could such a primitive theory have dominated Western thought for so long, Kuhn wondered? "I was sitting at my desk with the text of Aristotle's *Physics* open in front of me. . . . Looking up, I gazed abstractedly out the window of my room. . . . Suddenly the fragments in my head sorted themselves out in a new way, and fell into place together. . . . That sort of experience—the pieces suddenly sorting themselves out and coming together in a new way—is the first general characteristic of revolutionary change that I shall be singling out."[3]

Fragments "sorting themselves out and coming together in a new way" is a good characterization of the paradigm shift. "Pieces fitting together" exemplifies the paradigm, and the reordering of these pieces into a new and coherent pattern constitute its "shift." In this sense, Kuhn had experienced a kind of minor paradigm shift of his own. He saw that Aristotle had merely sorted out the pieces of the natural world according to his own time and culture, wherein fire belonged with the sun and stars in the sky, rocks belonged with the earth, and in between belonged water, wind, and rain. This general order could be confirmed by simple everyday experience and observation—just as it can today.

From Aristotle's perspective, it would probably seem strange that we now understand these phenomena in terms of an invisible but irresistible force called gravity. But starting with the paradigms of physics that gradually replaced those of Aristotle in the fateful seventeenth century, researchers became convinced that gravity as an independent force must exist. Centuries later, in 1916, Albert Einstein confidently

predicted the existence of "gravity waves" in his theory of relativity. Nevertheless, it took another 100 years, until 2016, for the existence of such waves to be confirmed. To simply believe, during the decades and centuries in between, in the self-evident reality of the otherwise invisible force of gravity, would have been hardly natural or inevitable. As Kuhn says, it "demands a deep," even "quasi-dogmatic . . . commitment to a particular way of viewing the world and of practicing science in it."[4]

Kuhn has much more to say about this "quasi-dogmatic commitment" to a paradigm and its predictions. He describes this commitment as nothing less than "actually constitutive of research" in the natural sciences.[5] "Normal science," he explains, "consists in . . . increasing the extent of the match between . . . [existing] facts and the paradigm's predictions, and by further articulation of the paradigm itself." Kuhn calls the delayed confirmations of predictions "puzzle solving" or even "mopping-up operations." These kinds of patching or tidying up activities, Kuhn explains, "are what engage most scientists throughout their careers." In a sense, Kuhn continues, "the scientist is a puzzle-solver like the chess player, and the commitment induced by *education* is what provides him with the rules of the game being played in his time."[6]

It is education, then, that commits the scientist to his or her paradigm and to the corresponding rules of the game. Of course, it is here that textbooks play a crucial role. For textbooks provide the "stereotyped" and simplified versions of paradigmatic problems—problems that have already been solved by the paradigm. And these textbooks frequently ask students to solve simplified versions of these problems for themselves: "[Text]books exhibit, from the very start, concrete problem-solutions that the profession has come to accept as paradigms, and they then ask the student, either with a pencil and paper or in the laboratory, to solve for himself problems closely modelled in method and substance upon those through which the text has led him."[7]

The textbook, in other words, not only presents a simplified and sanitized version of the prevailing paradigm; it also has the student reenact some of the most basic procedures and activities that confirm and underpin it. Science textbooks (as well as museums and labs) are chock-full of these "problem-solutions." Take, for example, frog dissections and experiments of the kind shown in figure 7.1.

Experiments of these kinds facilitate the "rediscovery" of galvanic currents, which were originally identified in 1797. Or consider the simple prism, which enables the exploration of the visible part of the electromagnetic spectrum. The "problem-solution" that this simple demonstration illustrates is the nature and order of this spectrum, which is otherwise mixed and unordered in natural light.

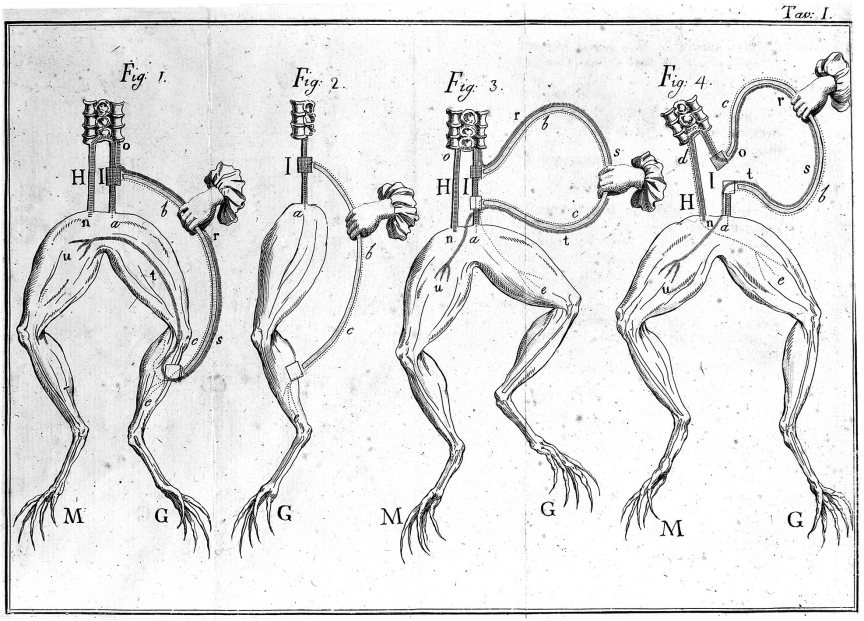


Figure 7.1. Memorie sulla elettricita animale, by Luigi Galvani (1797). This represents a typical problem-solution for demonstrating the electromechanics of muscle movement. *Source:* Wikimedia Commons

There are even elaborate thought experiments such as Einstein's speeding trains and falling elevators; or Schrödinger's neither-dead-nor-alive cat that provide similar didactic opportunities for modern physics. Speaking more generally, Kuhn concludes: "Close historical investigation of a given specialty at a given time discloses a set of recurrent and quasi-standard illustrations of various theories in their conceptual, observational, and instrumental applications. These are the community's paradigms, revealed in its textbooks, lectures, and laboratory exercises."[8]

This close relationship between the textbook and the scientific paradigm is central to my argument, and I will return to it again in the conclusion of this chapter. Although the "recurrent and quasi-standard illustrations" identified by Kuhn are indispensable to the textbook, there is actually quite a bit more to it. What are the features that have characterized these books over the centuries? To find out we need to look at how "textbook" and related terms arose centuries ago. We also need to consider even earlier examples of this genre—effectively textbooks *avant la lettre*—and their visual and rhetorical characteristics.

The Textbook *avant la lettre*

The word "textbook" is a relatively recent addition to the English language. As McLuhan notes, it seems to have made its first appearance only about 300 years ago, in reference to a book of a "Classick Author written very wide by the Students, to give room for an Interpretation dictated by the Master, &c., to be inserted in the Interlines (*OED*). Before printing, much . . . time in school and college classrooms was spent in making such texts. The classroom tended to be a scriptorium with a commentary. The student was an editor-publisher."[9] Here McLuhan is referring to practices of dictation, gloss, and commentary, which, as I explain in chapter 8, were very common in the university lecture prior to 1800 (see figure 8.2 as an example of a text "written very wide" to allow room for commentary). However, the point is that the textbook, in one of its earliest definitions, is not only closely connected with the lecture but is also a relatively recent coinage.

In the centuries prior to McLuhan's example, there were texts that clearly anticipate the characteristics of today's textbook. Just as there were media theories before the term "media theories" became common, there were also textbooks created *avant la lettre*, before the word "textbook" itself came into usage. In fact, I believe that two of the oldest and most famous examples, both from more than two millennia ago, provide some of the clearest illustrations. The first is an anonymous compendium, the *Zhou Bi Suan Jing* or *Arithmetical Classic of the Gnomon*[10] *and the Circular Paths of Heaven*. Like the *Qiānzìwén* (the *Thousand Character Classic*) discussed in chapter 2, it appeared sometime during the Zhou Dynasty (1046 to 256 BCE). But instead of 1,000 characters, this *Arithmetical Classic* contains 246 practical problems, solutions, and associated proofs or algorithms and is structured as a dialogue between the Duke of Zhu and a particularly knowledgeable minister. Recently translated into English,[11] this book deals with the famous problem-solution of the Pythagorean theorem ($a^2 + b^2 = c^2$ as shown in figure 7.2), using fewer than half the number of mathematical steps of standard Western proofs and illustrations.

This particular example of explanatory efficiency in visual expression and layout—noted by visual design expert Edward Tufte[12]—embodies one key characteristic of the textbook, even as a genre *avant la lettre*. That is its careful visual design and economy, the first of four main characteristics of the textbook that I will enumerate.

Another early textbook is Euclid's *Elements*, also a compendium, which is said to provide history's oldest "axiomatic-deductive" treatment of mathematics and

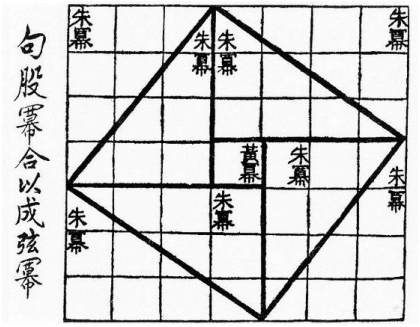
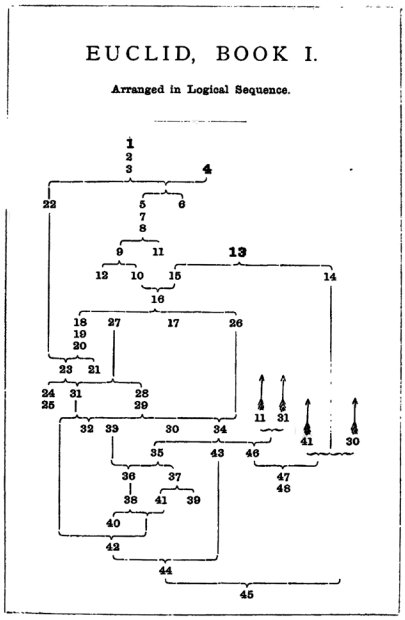


Figure 7.2. The Pythagorean theorem in the *Zhou Bi Suan Jing*. The area of the four bold triangles is equal to the area of the large oblique square, minus the small square in the center. *Source:* Wikimedia Commons

geometry. It begins with the most elementary principles of these subjects and logically elaborates the basis for "Euclidian" geometry and many other subjects. The *Elements* offers a total of 131 definitions. One reads, "A line is breadthless length." The definitions become the foundation for a further 468 propositions, including this example: "In any triangle two angles taken together . . . are less than two right angles."[13] And these propositions, in turn, serve as the basis for a range of mathematical theorems, proofs, or examples (figure 7.3).

The tightly dovetailed logic of Euclid's *Elements* served as a foundation for the works of Newton and Galileo in the seventeenth century and inspired similar treatments of logical "elements" by thinkers like Baruch Spinoza and Ludwig Wittgenstein. A recent account explains: "The *Elements* of Euclid was an introductory textbook covering all *elementary mathematics* . . . the most successful mathematics textbook ever written. . . . [I]t has been estimated that . . . at least a thousand editions have been published. Perhaps no book other than the Bible can boast so many editions, and certainly no mathematical work has had an influence comparable [to it]."[14]

Euclid's *Elements* and the *Zhou Bi Suan Jing* present rudiments of many of the key characteristics of today's textbooks. I already identified visual and design economy as the first of these features. The second is the textbook's authorship: textbooks are "unusual and difficult . . . in the mode of their authoring," as one study observes.[15] Neither of the two examples above actually originates from a single mind or hand; instead, they are collections or compendia. The organization (from their largest parts to their smallest definitions) reflects ways of thinking



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	Theorems and Examples on Book III.	

Figure 7.3. Pages reproduced from two late-nineteenth-century versions of Euclid's *Elements*. The tree diagram (*left*) shows the logical sequence of theorems from the first book of the *Elements*. The contents of a student's edition (*right*) indicates the progression of topics from fundamentals (Book I) to more complex "geometric algebra" (Book II), and the "theory of circles" (Book III). This listing also illustrates how each book of the *Elements* (there are 13 in total) is organized in roughly the same way: starting with definitions, then moving to propositions, and finally, including theorems and examples. *Source:* Archive.org

that are not of one author or personality. Instead, these follow a logic that is geometric, mathematical, or even simply "dialogical" (as in the dialogue between the Duke of Zhu and his minister in the *Zhou Bi Suan Jing*). Indeed, even when a single author's or publisher's name has become indisputably associated with a textbook (like Euclid's *Elements*), the corresponding name often appears not under the book's title, but within it; consider, for example, *Gray's Anatomy*, *Strunk and White*, or the *Norton Anthologies*.

Third, these two examples show how textbooks are ordered in very deliberate and highly detailed ways to facilitate repeated reading and study. As a comprehensive study by Chambliss and Calfee observes, "Textbooks come in layers, something like an onion." They also add: "The outer husk, as signaled in the table

of contents, seldom receives the attention it deserves."[16] The carefully structured layers of the textbook are clearly illustrated in the table of contents for Euclid's *Elements* (figure 7.3). Each of its logically interlinked 13 "books" (or topics) breaks down into the same (or similar) subsections: "Definitions," "Propositions," "Theorems," and "Examples." Larger, closely interwoven layers encompass lesser ones that are similarly interconnected, forming an almost fractal, three-dimensional patterning. Textbooks in other disciplines also follow deliberately defined structures. Take, for example, *Gray's Anatomy*, which first appeared in 1875. As one would expect, it is organized according to the different systems in the body. After covering the fundamentals of anatomy and prenatal development, this famous text begins with bones and muscles and proceeds to the circulatory, lymphatic, and nervous systems. Today in its 41st edition, *Gray's Anatomy* is organized in a spatial sequence, following the human body from head and neck to pelvis and legs. The choice of order is not a trivial matter, but reflects both the learning needs of the student and the state of the art of the particular discipline.

Finally the elementary pattern of dialogue is both historically and rhetorically vital in the textbook. *Zhou Bi Suan Jing* provides an important example. Although it does not offer quite the same multilayered, iterative organization of the *Elements*, it presents an extended conversation between a duke and his advisor—a form of presentation that serves to contextualize and dramatize its content. These two forms of organization—one conversational, based on spoken interaction, the other structural and based on a sequenced procedure—form two threads that have been interwoven in the history of the textbook since the invention of the printing press. In what follows, I show how structural forms of organization of all kinds have become increasingly conspicuous, while dialogue is in some ways suppressed. However, this is only an apparent suppression.

The Catechism: Teacher-Proofed "Propaganda"

For both the textbook and the lecture, the invention of the printing press did not result in any immediate or revolutionary changes. Instead it was upheavals in the broader culture that led to related adaptations in these educational forms. In the case of the textbook, it was the tumult of the Protestant Reformation mentioned in chapter 3 that is most closely associated with innovation. Central to these turbulent events is Martin Luther's original break with the Catholic Church and the subsequent propagation of Protestant denominations and sects. These events also include the sweeping Counter-Reformation within the Catholic Church. Like never before, Christianity was engaged on multiple fronts in a battle of doctrine

and dogma, in a social and spiritual battle for hearts and minds. It is this battle that historians believe constituted the crucible for some of the most basic and widespread forms of schooling and pedagogy.[17]

In declaring that individual faith alone is important, Luther and other reformers like John Calvin argued that direct access to the "truth" of God's written word must be universal. Knowledge of religious truths in Latin manuscripts could no longer be the privilege of the few. Instead, access to this one "truth"—in one's own mother tongue—became a necessity for all: "If the medieval church had adopted schooling merely to discipline its cadre of teachers and preachers, Calvinists . . . and . . . Lutherans . . . began to use schooling for a broader political purpose—the disciplining of the population at large. Schooling, that is, underwent its own reformation."[18]

In this effort, the printing press was indispensable. However, Gutenberg's invention was not used simply to repurpose preexisting content for religious education. Luther's translation of the New Testament into German (1522), and Henry VIII's commissioning of the "Great Bible" in English (1530s) proved insufficient for purposes of mass religious indoctrination. Each eager lay reader of a newly translated Bible seemed to come up with his or her own interpretation of this collection of 66 heterogeneous books. Disagreements on the finer points of the Holy Trinity or the meaning of baptism, or even on appropriate head coverings for church attendance, led to disagreement and division. Both biblical interpretations and Protestant denominations proliferated rapidly—further fomenting the conflict and strife that was spreading across Europe.

Luther realized that instead of expecting lay people to read the Bible directly, preexisting educational genres needed to be remixed and adapted for them. This work resulted in a new form that can be said to have been "born typographic," much in the same way that documents and other resources are now "born digital." The preexisting educational and devotional genre in question was the catechism, structured by pre-set questions and recited answers. In the 1500s, this centuries-old form was reimagined by Luther and subsequently by many others for Protestantism, for the printing press, and for the instruction of the masses. The catechism became "the chief instrument" in an "unprecedented venture," as historian Gerald Strauss explains. This was the "conscious, systematic, and vigorous effort . . . to change the human personality" for religious (and also political) purposes. And this was achieved, Strauss adds, primarily "through pedagogical conditioning."[19]

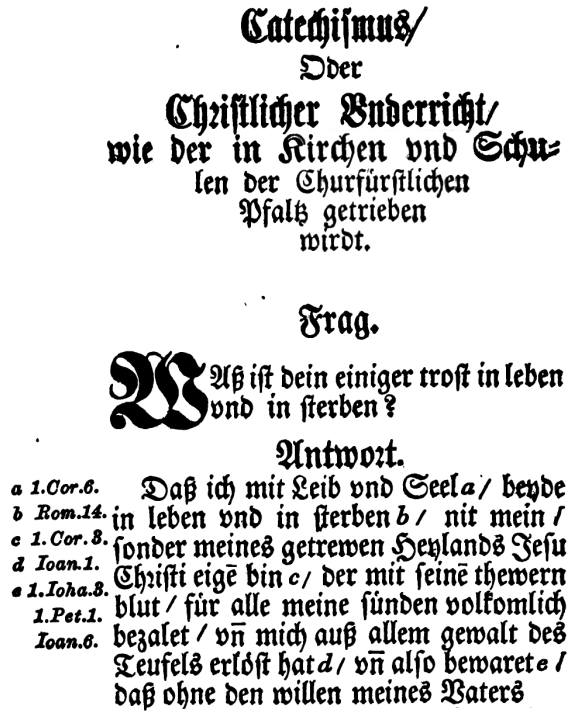
As an instructional genre, this repurposed printed catechism spread like wildfire: from "Greenland to Galicia," as another historian writes, various versions of the catechism were "the key to religious education."[20] The explicit goals

of this education, however, were rather different from those considered important today: "The whole point of the catechism was that it was *safe*. Repeating set phrases rooted the basic religious tenets in the minds of the masses and, by stressing the religious basis of civic obligation, its use strengthened the social order. The potentially disruptive influence of reading the Bible and of independent thought was substantially reduced."[21]

In response to the conflict he had helped to unleash in central Europe, Martin Luther formulated his "lesser catechism" in 1529, a small book which later came to be known as the "Layman's Bible." "[Y]oung and simple people must be taught by uniform, settled texts and forms," Luther reasoned, "otherwise they easily become confused." And "those who are unwilling to learn" this catechism, he added, "should simply be turned back to the Pope and his officials, yea, to the devil himself."[22] In fact, in further discussing his catechism, Luther seems to have recorded one of first uses of the modern German term for textbook: "specifically as a small *textbook* (*Lehrbüchlein*), song book, confessional book, [and] prayer book").[23]

Instead of providing access to the Bible in all of its length and complexity, the catechism does something much more humble but also much more pedagogically focused. Learners or initiates are asked questions by a teacher or by each other based on what is written in the catechism. The corresponding answers are similarly scripted, and are generally to be recited from memory. The questions and answers generally repeat or reference selected passages from the Bible—for example, the Ten Commandments or the Lord's Prayer. In this way, young learners become speakers of specific biblical phrases and statements of faith, leaving no room for doubt or doctrinal variance: "With unchangeably familiar questions and predictable answers it was the very paradigm of the safe and static condition in which the reformers hoped to come to rest after the headlong mutability and confusion of their own time of troubles. In the most developed form of catechism practice, where children stood up in pairs to ask each other the prescribed questions and give the required answers, the procedure approached the ideal of a fully internalized and self-perpetuating system of indoctrination."[24] Anyone educated in this way could make no mistake about what was right or wrong, about how to pray, or even about what to think about the Father, Son, and Holy Ghost. And this kind of safe, even absolute, certainty could be provided with a minimum of preparation and equipment—one catechism text, an adult able to read it, and any number of others ready to learn it.

The facsimile and translation in figure 7.4 is from the *Heidelberg Catechism,* a widely popular Protestant text that appeared about 50 years after Luther's



Catechiſmus/
Oder
Chriſtlicher Vnderricht/
wie der in Kirchen vnd Schulen der Churfürſtlichen
Pfaltz getrieben
wirdt.

Frag.

WAß iſt dein einiger troſt in leben vnd in ſterben?

Antwort.

a 1.Cor.6. Daß ich mit Leib vnd Seel a / beyde
b Rom.14. in leben vnd in ſterben b / nit mein /
c 1.Cor.3. ſonder meines getrewen Heylands Jeſu
d Ioan.1. Chriſti eigē bin c / der mit ſeinē thewern
e 1.Ioha.3. 1.Pet.1. blut / für alle meine ſünden volkomlich
Ioan.6. bezalet / vñ mich auß allem gewalt des
Teufels erlöſt hat d / vñ alſo bewaret e /
daß ohne den willen meines Vaters

Figure 7.4. First page of the *Heidelberg Catechism* from the 1560s and in translation.
Source: Image from Wikimedia Commons; translation from Centre for Reformed Theology and Apologetics, 2012

Catechism or Christian Instruction as it is undertaken in churches and schools in the princely Palatinate.	(1st reading; the 1st Sunday)* **Included in many early editions.*
Question. What is your only comfort in life and death?	
Answer.	a I. Cor. 6.
That I belong with body and soul[a] / both	b Rom. 14.
in life and in death[b] / not to myself, but to	c I. Cor. 6.
my faithful Saviour Jesus Christ[c] / who	d Joh. 1.
fully paid for all my sins with His	e I Joh. 8.
precious blood, and has set me free/ from	I Pet .1.
all the power of the devil[d] / He also	Joh. 6.
preserves me[e] in such a way / that without	
the will of my heavenly Father	

version. It displays a number of characteristics that I have already identified as central to the textbook as a pedagogical form, including its logical and dialogical structure and its method of exposition. The identification of the "first reading" and "first Sunday," at the top right, is a way of foregrounding the sequential structure of the book and also of scripting its use. This catechism is divided into 52 parts, with each corresponding to a Sunday over the course of a year. It thus reinforces regularity of pedagogical practice and gives it a kind of logic that also corresponds to Christian sacraments and celebrations. It opens with the question of the reader's or catechist's life and death, and it concludes with the question of the meaning of the ceremonial "amen." In between, it provides instruction about ("catechizes") the life of Christ over the Easter season and uses much of the remaining space to cover the Ten Commandments and the Lord's Prayer. The lettered references to various passages in the New Testament establish connections within the catechism page itself and provide linkages to biblical sources outside. Of course, this catechism and others like it do not follow a strictly axiomatic or methodological organization as exemplified in Euclid's *Elements*. Instead, they work to inculcate in their readers dialogically, through question and answer, what some might regard as theology, others as religious tradition, and still others as "arbitrary dogma."

The *Heidelberg Catechism* also displays a wide range of detailed typographical variation and cueing—part of the careful and efficient visual organization characteristic of the textbook. That range includes multiple typefaces (in Gothic and Latin styles), font sizes, superscript characters, and dropped capitals. Although these elements were not unknown in texts before the printing press, they could not be easily and accurately reproduced in detail—much less en masse. What's more, the whole premise of a catechism of this kind—the specific religious confession it contained that was designed to provide a "uniform and settled text" for memorization—depended on the printing press. Without its unfailingly precise ability to mass-produce words and sentences, the idea of creating and disseminating identical texts for mass use or "indoctrination" would have been inconceivable.

There is much more to the catechism than its uniform and settled form and content, however. In addressing the reader as "you," regarding "your only comfort in life and death," and having the reader answer as "I," this catechism and many others like it deploy a powerful rhetorical (even political or ideological) technique. This technique involves direct address to those reading and reciting, so that the catechism quite literally transforms these participants into "Christian religious subjects." This is how Louis Althusser, one of Foucault's teachers in

Paris, describes the effect of the catechism. Althusser posits that the catechism (and later, myriad modern forms, including advertising) accomplishes this through a process of "*interpellation* or hailing."[25] In reading and reciting words about their own life and death, body and soul, Althusser explains, catechists are hailed, or called upon, to play or internalize a certain role, to make prescribed yet powerful statements about themselves and their lives.

Through the question-and-answer format of the catechism, subjects are asked to respond: "*Yes; it really is me!*" They "obtain from" the words in the text "the *recognition* that they really do occupy the place it designates for them as theirs in the world, a fixed residence."[26] In this way, the individual catechist becomes a "subject," openly taking on an established role and identity, and openly "subjecting" him- or herself to God's will. However, Althusser emphasizes that the individual thus becomes a subject not as a result of the teacher or the book but by virtue of God and His absolute selfhood: "We should note that all this 'procedure' to set up Christian religious subjects is dominated by a strange phenomenon: the fact that there can only be such a multitude of possible religious subjects on the absolute condition that there is a Unique, Absolute, Other Subject, i.e. God. . . . God thus defines himself as the Subject *par excellence*, he who is through himself and for himself ('I am that I am'), and he who interpellates his subject, the individual subjected to him by his very interpellation."[27]

The religious catechism positioned and defined its readers or users not only as religious subjects, but also as reciting and reading subjects—as literate subjects, at least after a fashion. Like the "literacy" of the traditional Jewish Torah schools (chapter 2), this kind of literacy is different from what we generally understand by the term today. It did not see its subjects as authors of their own texts and focused not on reading but on memorizing a limited set of texts to the exclusion of writing. Students were not seen as the authors of their own words or thoughts, but were instead trained as the recipients of the words of God and other authorities. Those few who were in fact taught to write at this time were seen as copyists, recording the words of others.[28] Instruction was focused on reading the Bible and catechetical texts to the exclusion of all others; in this regard, the form of the catechism was perfectly matched to its time:

> Learning to read . . . bore sense only in that it was useful to ensure the population's elementary religious knowledge. The tools for reading were no other than prayer and catechism books. In both Protestant and Catholic regions, the method of learning was the same: From texts already known by heart, because

> learnt orally within the family or in Church service, the teacher made children break down words by making them spell the letters and pronounce the syllables. In fact, the young reader connected the signs identified in the page with the text he knew by heart.[29]

The author of these words, historian of reading instruction Ann-Marie Chartier, concludes by saying that in such an instructional configuration, "learning to pray and learning to read were the same thing."

Secularizing the Catechism

The catechism gradually came to present a kind of template for schooling in secular as well as religious subjects. Particularly important was its evident efficiency, allowing for basic mass education with the barest of teacher preparation: "If the goal were memorization, the catechetical style eliminated the need for either pedagogical knowledge or subject knowledge on the part of the teacher. The voice of the teacher and the textbook author were not only in agreement, they were the same!"[30]

As it came to be used in secular education, the catechism provided a kind of script for oral educational performance, one that is potentially suited to any subject or dogma, however arbitrary its contents. For example, speaking specifically of books for language learning, J. F. Wakefield explains that

> the catechetical style [was in] evidenc[e in] . . . grammars well into the nineteenth century. Noah Webster (1758–1843) was perhaps America's most successful [textbook] author of the last half of the eighteenth century. Part II of Webster's (1783) *Grammatical institute of the English language* couched all of its definitions in question and answer format:
>
> What is Grammar?
>
> Grammar is the art of communicating thoughts by words with propriety and dispatch.
>
> What is the use of English Grammar?
>
> To teach the true principles and idioms of the English language.[31]

The identical, secularized voices of the teacher and the textbook author came to take the place of Althusser's Christian God as the subject or authority "par excellence." The "subjectivities" of the readers and reciters (e.g., figure 7.5) are still hailed or interpellated in the secular catechetical text, but their responses are not addressed to God; they are addressed to the infallibly reproduced text of the teacher and the textbook.

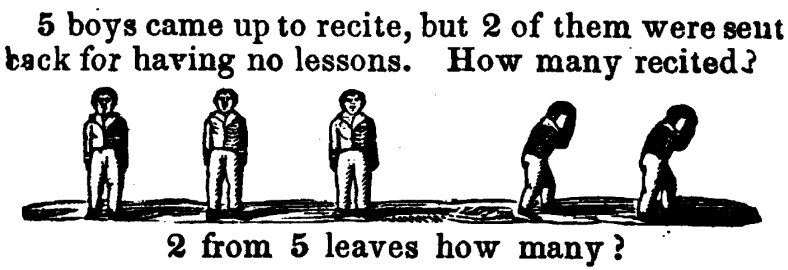


Figure 7.5. Recitation practice from an 1839 mathematics textbook for beginners. In using a concrete illustration of something familiar to schoolchildren, this textbook confirms the ubiquity of catechism as a method, and it recommends at many points that math equations and answers be "recited." Emerson, *North American Arithmetic,* 19. *Source:* Archive.org

Just as this type of catechism was becoming established in the United States, however, it was being subjected to criticism in Europe, even among educators of an explicitly religious bent. Johann Gottfried Herder, a pastor, linguist, and philosopher, scolds teachers in one of his "School Addresses" from 1800: "But remember, you catechists: The eternal to and fro from subject to predicate, from predicate to subject: 'Who created you? Who (else) did he create?' is not really catechizing, but actually a kind of bodily 'yawning' of the word . . . little more than the 'giddyap' of the coachman. . . . One must [instead] catechize in one's own words; one must draw one's own words out from that which is catechized. *One's own words*: these and these alone signify one's own thoughts."[32] True knowledge or belief, Herder is saying, is neither in the catechetic text nor embodied in the catechizing voice or body. What one knows is instead what one expresses "in one's own words," by directly "signify[ing] one's own thoughts." The voice of the teacher, the textbook author, and the student should no longer simply be "in agreement" or "the same," as Wakefield described earlier. It is no longer sufficient that everyone simply memorize "uniform, settled texts and forms" verbatim, as Luther had expected.

What Herder and others wanted students to do was to speak and think for themselves, to express themselves naturally in their own words, rather than to be scripted by an unvarying authoritative text. Their goal was the liberation of the student and the child from the authority of the text. They wanted students to be free to explore the wider world of knowledge for themselves. Perhaps not surprisingly, this is when the "educational superstar" Johann Heinrich Pestalozzi, discussed in chapter 5, again came into the picture. As discussed, Pestalozzi was heralded in his own time as no less than a latter-day "Martin Luther" or "Columbus"—

someone who had opened up vast new horizons in the world of education and instruction. His claim to fame was his universal method, but in terms of the textbook, his principal contribution was known as the "object" or "inductive method." Just as Pestalozzi wished to liberate childhood speaking and reading from overtly textual confines, he also wanted to liberate education from the limitations of teacher recitation and rote memorization. Often speaking specifically of the *Heidelberg Catechism*—at this point over 200 years old—Pestalozzi lamented: "In all catechizing the child is fettered, partly by the limits of the precise idea about which he is catechized, partly by the form in which he is catechized, and lastly, but certainly, by the limits of the teacher's knowledge, and still more by the teacher's anxious care that he should not be drawn beyond the circle of his knowledge. Friend! What terrible barriers for the child, that have been wholly removed by my method."[33]

But how could Pestalozzi's celebrated universal method simply remove the limits of the teacher's knowledge and the fetters of the textbook's words? How could a standardized book embody an affirmation of the individual's thoughts and words? Over the course of the nineteenth century, this paradoxical accomplishment was achieved by opening up the catechetical form and turning it in upon itself. At precisely the same time as the lecturer was also freed from slavish dictation and commentary the student was similarly freed from the rote learning of the catechetical textbook. Neither student nor teacher could be considered any longer simply as conduits for authoritative knowledge. Instead, they came to have their own authority, speaking their own words, and expressing their own thoughts and ideas.

Pestalozzi and the "Inductive" Textbook

As the word "induction" implies, Pestalozzi's famous method worked by moving the child logically from the subjective, individual, and tangible to the more abstract, categorical, and general. Pestalozzi describes this process in his own inimical way: "You are, as a physical living being, nothing but your five senses; consequently the clearness or mistiness of your ideas must absolutely and essentially rest upon the nearness or distance with which all external objects touch these five senses, that is, yourself, the center, because your ideas converge in you."[34]

The self, individual and subject, with its perceptions and ideas, is the only starting point for teaching and learning for Pestalozzi. What makes this starting point specifically inductive is that, as Pestalozzi emphasizes, it begins in the particularity of sense impressions and moves from there to various levels of generality or abstraction. Pestalozzi continues: "All knowledge gained by sense-impression

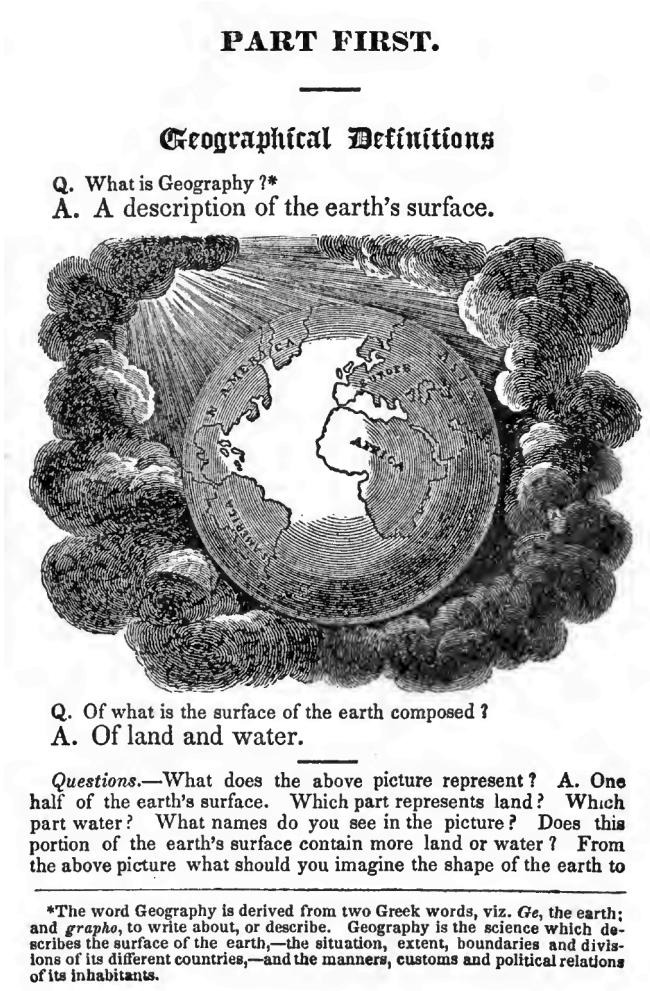
comes from *number, form* and *language:*"[35] We can count what we see, hear, and feel; we can also describe it (however rudimentarily; e.g., as big or small); and we can also label it. And in doing these things, we move from what is personal and particular to what is more general, abstract, even immaterial.

This inductive method is translated into textbook form not by telling students about their only salvation, as in the *Heidelberg Catechism*, or simply labeling the things of the visible world, as in Comenius's *Orbis Pictus.* The method is realized in the form of questions in the textbook that ask the student what they see and hear in the world around them. It does not happen through scripted catechetical responses, but through one's own words, through a kind of speaking with or for oneself. Following Pestalozzi's inductive method, as one historian explains, textbooks asked questions of their young readers that they could answer directly from experience; this led in turn to a kind of revolution in American textbooks and education. "The first Pestalozzian textbook," as one historian explains, "appeared in 1821, *First Lessons in Arithmetic*, compiled by Warren Colburn." The historian writes, "This book had a tremendous influence on all subsequent arithmetic textbooks. Its main contribution was to construe mathematics as a process of observation rather than as a 'ciphering' procedure. (How many thumbs do you have on your right hand? How many on your left? How many on both together?[36]) In all subject matter, the old *catechetical* questions common to earlier textbooks gave way after the 1840's to *inductive* questions."[37]

The inductive approach led the student away from prescribed answers, asking him or her "to determine an explanation for him [or her]self."[38] It used questions based directly on student experience—even experiences of catechetic recitation (figure 7.5)—to guide students through its content. Textbooks on the widest range of subjects soon followed:

> Roswell Chamberlain Smith, for example, in his *Intellectual and Practical Grammar in a Series of Inductive Questions* (1830) eschewed memorization of the rules of grammar, and instead used questions to develop an understanding of rules and definitions. Geography texts, too, used the "inductive method." Jessie Olney in his *Modern Geography* (1830) wrote that it was essential for the learner to thoroughly absorb the simple facts before more complex lessons could be understood. In all subject matter, the old catechetical questions common to earlier textbooks gave way after the 1840's to inductive questions.[39]

Looking at an example like Olney's *Modern Geography* (figure 7.6), it is not difficult to recognize that this method would probably be more easily applied to some



PART FIRST.

Geographical Definitions

Q. What is Geography ?*
A. A description of the earth's surface.

Q. Of what is the surface of the earth composed ?
A. Of land and water.

Questions.—What does the above picture represent ? A. One half of the earth's surface. Which part represents land ? Which part water ? What names do you see in the picture ? Does this portion of the earth's surface contain more land or water ? From the above picture what should you imagine the shape of the earth to

*The word Geography is derived from two Greek words, viz. *Ge*, the earth; and *grapho*, to write about, or describe. Geography is the science which describes the surface of the earth,—the situation, extent, boundaries and divisions of its different countries,—and the manners, customs and political relations of its inhabitants.

Figure 7.6. First page for student readers in Jessie Olney's Pestalozzian 1830 *Modern Geography. Source:* Archive.org

subjects than to others. Even the richest illustrations or personal experience would likely not equip a young student to answer a question like "What is geography?"—or to anticipate its Greek etymology. However, it is clear that this method certainly does place its trust in the student and his or her mental abilities—instead of relying on mindless rote learning. In particular (as illustrated in the questions beneath the image of the earth in figure 7.6), this method would engage the learner to draw conclusions from what he or she already knows and plainly sees.

Although the term "interaction" is generally reserved for engagement with computers or other sophisticated digital technologies, it is clear that textbooks have long been used to script teaching and learning activities in ways that prefigure instructional software. Like some of the most basic instructional computer games, the interaction may exist only on the level of call and response—or perhaps better, stimulus and response. Or the interaction may be much more sophisticated, responding to the student's own typed or spoken words. Either way, this form of student interaction has been developed and refined in textbooks for hundreds of years. And these methods are still in evidence in contemporary textbooks.

From the Inductive Method to the "Self-Explanation Effect"

Prompts and interrogatives—particularly Pestalozzian inductive questions asking students to both reflect on and generalize about their experience—abound in well-designed textbooks today. For example, one contemporary introductory psychology textbook (figure 7.7) opens by discussing the differences between nature and nurture. It asks, "Have you ever found yourself reacting to something as one of your biological parents would . . . and then wondering how much of your personality you inherited?" Through a question of this kind, this book not only prompts a kind of induction from the student's own life to more general psychological categories; it also offers a concrete example that is likely of direct relevance to its first-year-student readers. It provides concrete illustrations (of young smiling faces) to serve as the basis for further inductive prompts—in this case, questions about the universality of the human smile.

Reminiscent of the *Heidelberg Catechism*, this modern-day psychology textbook begins by using straightforward language that places the reader in a kind of cosmic order that is consistent with its overall intent. Of course, the text does not ask about one's only "comfort in life and death," but instead positions the reader in a complex and sometimes mysterious material cosmology, with the implicit promise (underscored by a quotation from the seventeenth-century philosopher Benedict Spinoza[40]) that a dispassionate and material psychological science can shed light on these mysteries and complexities. Textbooks like this one also make extensive use of a variety of these techniques involving typefaces, images, references, and graphical organization that echo those in the *Heidelberg Catechism* but also go far beyond it.

Although these techniques appear as a careful collation of conventions, procedures, and methods that have accumulated over the centuries, they are described today in terms that are dramatically different from those of Luther or Pestalozzi. Consider for example the inductive questions posed in Pestalozzian textbooks and

PROLOGUE

The Story of Psychology

Harvard astronomer Owen Gingerich (2006) reports that there are more than 100 billion galaxies. Just one of these, our own relative speck of a galaxy, has some 200 billion stars, many of which, like our Sun-star, are circled by planets. On the scale of outer space, we are less than a single grain of sand on all the oceans' beaches, and our lifetime but a relative nanosecond.

Yet there is nothing more awe inspiring and absorbing than our own inner space. Our brain, adds Gingerich, "is by far the most complex physical object known to us in the entire cosmos" (p. 29). Our consciousness—mind somehow arising from matter—remains a profound mystery. Our thinking, emotions, and actions (and their interplay with others' thinking, emotions, and actions) fascinate us. Outer space staggers us with its enormity, but inner space enthralls us. Enter psychological science.

For people whose exposure to psychology comes from popular books, magazines, TV, and the Internet, psychologists analyze personality, offer counseling, and dispense child-rearing advice. Do they? Yes, and much more. Consider some of psychology's questions that from time to time you may wonder about:

- Have you ever found yourself reacting to something as one of your biological parents would—perhaps in a way you vowed you never would—and then wondered how much of your personality you inherited? *To what extent are person-to-person differences in personality predisposed by our genes? To what extent by the home and community environments?*
- Have you ever worried about how to act among people of a different culture, race, or gender? *In what ways are we alike as members of the human family? How do we differ?*

WHAT IS PSYCHOLOGY?

Psychology's Roots

Psychological Science Develops

CONTEMPORARY PSYCHOLOGY

Psychology's Biggest Question

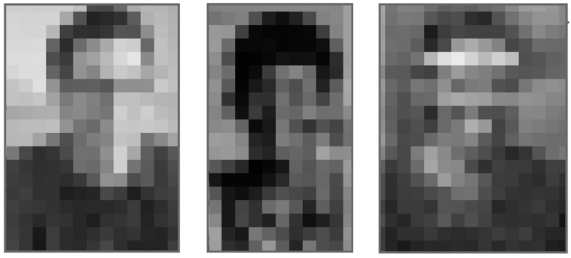
Psychology's Three Main Levels of Analysis

Psychology's Subfields

Close-Up: Tips for Studying Psychology

"I have made a ceaseless effort not to ridicule, not to bewail, not to scorn human actions, but to understand them."

Benedict Spinoza, *A Political Treatise*, 1677



A smile is a smile the world around Throughout this book, you will see examples not only of our cultural and gender diversity but also of the similarities that define our shared human nature. People in different cultures vary in when and how often they smile, but a naturally happy smile *means* the same thing anywhere in the world.

1

Figure 7.7. This page from a recent psychology textbook brings together a range of graphical and textual techniques that have developed over centuries. This page addresses the reader directly (as "you") three times, asking him or her no fewer than six different broadly inductive questions, harking back to the *Heidelberg Catechism* and making use of 12 different typefaces to order its content and to structure student attention. *Source:* Myers, *Psychology* (New York: Worth, 2009), used with permission; photographs have been blurred due to copyright restrictions

the kind of thinking they were meant to produce. According to the vocabulary of today's psychology, to articulate a response to a question encountered in a text is not so much to express "the ideas converging in you" as it is to engage in "self-talk" or "self-explanation." The idea today is that instead of talking, explaining, or elaborating on something to a listener, the talking is being done for and to ourselves. Following a broadly Chomskian cognitivist psychology, the self in this context is seen as reflexively communicating and processing its thoughts—or rather, its cognitive or "metacognitive" data—directly with itself in a kind of self-contained feedback loop. And these thoughts, moreover, are regarded simply as one of a number of kinds of data or information that is to be processed in the mind.

"Self-explanation" and other processes that the self can redirect back upon itself were originally explored by psychologist Alfred Bandura. Bandura's specific interest was in the application of these processes in academic contexts to optimize cognitive functioning and test performance. The result has been the development of an entire sub-specialization in the self-regulation of cognitive states and processes that apply to students' reading and study of textbooks and other instructional material (figure 7.8). Research into self-regulated learning has given a special place to "elaboration" that is prompted by written questions and to the self-explanation that takes place specifically in response to inductive questioning in textbook study.

In studies of self-explanation, subjects are asked to think (or cognize) aloud while attempting to develop a solution to a sample textual problem. These studies consistently report that when students make use of self-explanation, their performance is demonstrably improved, and these results have served as the basis for models of students' self-regulating cognitive systems (figure 7.8). In this research, students are observed to "generate many explanations which refine and expand the conditions for the . . . example solutions, and relate [these] . . . to principles in the text." Such self-explanations work best when they "are guided by accurate monitoring of [students'] own understanding and misunderstanding."[41] "Good students," another article concludes, "explain examples to themselves[,] learn better [and] make more accurate self-assessments of their understanding . . . [all] while solving problems."[42]

Of course, example-solutions and problem-questions are hardly new. Thomas Kuhn identified these same questions and examples as indispensable not only in science textbooks, but also in the creation—and eventual destabilization—of scientific paradigms. Even Assyriologists have studied their use in clay tablets from the second millennium BCE. Cognitive psychologists measuring the benefits of self-elaboration and self-explanation can thus be said to be participating in a

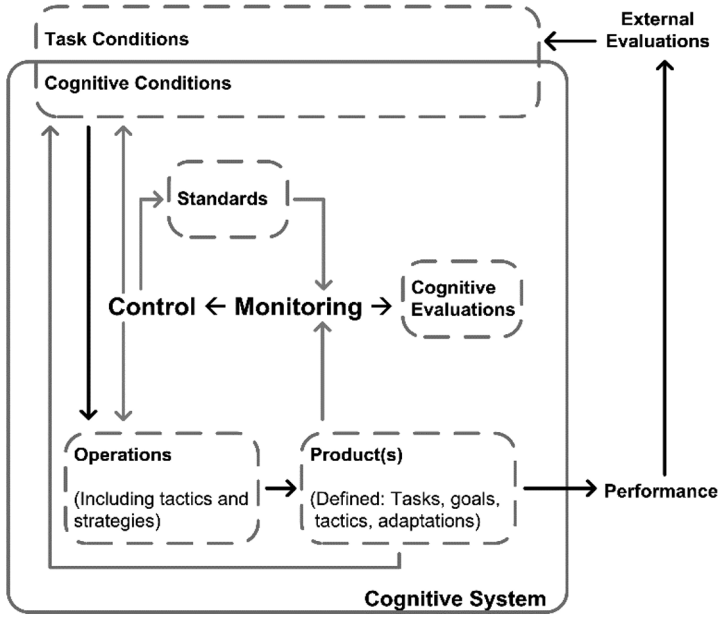


Figure 7.8. A model of a "self-regulating" cognitive system in an academic task environment. The "self" in this cognitive system is centered in activities of control and monitoring, with an external feedback loop connecting (test) performance with task conditions. *Source:* Adapted from Perry and Winne, "Learning," 213

millennia-old tradition in instructional technique, and to be drawing deeply from instructional methods that have been known and used for many centuries.

However, there is one obvious difference separating earlier discussions of problem texts and examples from more recent cognitivist theory. That is the language used to discuss the mind and, ultimately, the self or subject who is engaged in study. For Pestalozzi, the self represents the meeting point of "the five senses" with one's earlier sensory experience. Such a reflective and self-aware self, as Pestalozzi explains, is at "the center" with "all of your ideas." But modern—or perhaps more accurately, postmodern—accounts of "self-talk" or "self-explanation" imply a rather different conception of the self. This modern self is constituted through the coordination of a number of "executive functions." Essentially, this includes the accurate monitoring, control, and ideally, optimization, of its various performances or operations—including the specifically academic functions of self-explanation and textual elaboration. This postmodern self is an optimally self-regulating and self-optimizing one that also appears in the most recent accounts of the

lecture—where its operations are coordinated to produce a maximally engaging and informative "talk."

Shift Happens?

I began this analysis of the textbook with a discussion of Thomas Kuhn and his view of the textbook as critical in the formation (and shift) of scientific paradigms. I quoted Kuhn as saying: "these books exhibit, from the very start, concrete problem-solutions that the profession has come to accept as paradigms, and they then ask the student, either with a pencil and paper or in the laboratory, to solve [these problems] for himself. . . ."[43]

If the contemporary textbook is indeed an accumulation of tricks and techniques marshaled for student learning, then according to Kuhn, they are also marshaled for the sake of the dominant paradigm. The problem-solutions, the student's self-explanation, induction, and even catechetical memorization all work together to give the paradigm an aura of self-evident truth and authority. To put this even more bluntly, according to Kuhn, the task of the textbook—and of scientific education more broadly—is entirely dogmatic. It is a task very different from that of scientific research itself: "Though scientific development is particularly productive of consequential novelties," Kuhn observes, "scientific education remains a relatively dogmatic initiation." It is a single, unswerving path that, Kuhn further explains, takes the student "into a pre-established problem solving tradition that [he or she] . . . is neither invited nor equipped to evaluate."[44]

Although Kuhn's formulations may seem alienating in the depth of their cynicism, they highlight an important point: that the structuring, simulation, and stimulation characteristic of the textbook are hardly properties of scientific or disciplinary knowledge itself. They instead belong to knowledge that has been made didactic or pedagogical. Like the book, when understood as an epistemic metaphor, the textbook can be said to be a container or "vial" that encloses its own specific "potency of life." This potency, however, is one that is thoroughly pedagogical. Through its lively images and formatting, its interactive problem-solutions, questions, guides, and prompts, the textbook does not so much bring its author's experience or ideas to life as it vivifies the originality and (re)discovery of the dominant paradigm. This presentation of educational knowledge represents an indispensable but often ignored stage in the production and reproduction of knowledge.

Chapter Eight

From *Translatio Studiorum* to "Intelligences Thinking in Unison"

> One speaking mouth, with many ears, and half as many writing hands—there you have the external academic apparatus.
>
> —FRIEDRICH NIETZSCHE, 1872

The academic lecture, with its single speaking mouth and many listening ears and writing hands, is the second case study that I present. The lecture has a history that goes back hundreds of years, and during that time it has reflected how writing, speaking, and printing have shaped education. It has also integrated successive waves of new media—from the phonograph to the iPhone—that have interacted with teaching and learning as well. The lecture has adapted to medieval, early modern, romantic, and postmodern educational philosophies and priorities. It could even be said to serve as a kind of nexus point for educational change and continuity. Different media and educational formations and possibilities are constantly being reconfigured around the lecture, and these configurations have the power in turn to adjust the function and character of the lecture itself. This first chapter on the lecture focuses on its history; the next will examine its contemporary situation and possibilities.

I begin, however, with a brief summary of contemporary circumstances. Today, as in earlier decades and centuries, the lecture is widely criticized in educational discourse as a method for teaching and learning. It is labeled old-fashioned "chalk and talk" and has even been considered so instructionally ineffective as to be "unethical."[1] The lecturer him- or herself has been described as an antiquated "sage on the stage," who is to be replaced by an interactive, constructivist "guide on the side."[2] Speaking slightly more theoretically, in *The Postmodern Condition*, a

1979 text that helped make "postmodern" a household word, Jean-François Lyotard considers the role of the lecture in knowledge production and circulation. He simply could not bring himself to see the lecture as important in the technically advanced postmodern world that he envisioned. Lyotard correctly foresaw that students would be accessing "traditional memory banks (libraries, etc.) and other computer data banks [via] intelligent terminals"—today's tablets and smartphones. But Lyotard was not as prescient in his musings about the lecture: "It does not seem absolutely necessary that the medium be a lecture delivered in person by a teacher in front of silent students. . . . Pedagogy would not necessarily suffer."[3]

Another significant critique of the lecture is offered in Diana Laurillard's 2001 book, *Rethinking University Teaching*. Laurillard evaluates a broad range of educational forms and media in terms of their systemic, informational functions (e.g., as serving a narrative, interactive, or communicative role). She labels the lecture, along with print, video, and DVD as "narrative" or "discursive" in function. She maintains that the lecture, like printed copies or a video broadcast, works to disseminate information to its audience. It is "non-interactive . . . linear presentational media"—part of a "transmission model of education."[4] The lecturer simply communicates his knowledge orally to the students, who, passively listening and writing, are expected to reproduce that knowledge. The lecture is thus singled out by Laurillard as especially defective, inefficient, and outmoded. It is, she asserts, "a very unreliable way of transferring the lecturer's knowledge to the student's notes," and it is suited only to "what is elegant or pleasing" rather than what is "difficult and complex." Indeed, harking back to the "great divide" between orality and literacy (see chapter 6) Laurillard dismisses lecturing as a throwback to a "narrative form of the ancient oral cultures."[5] Laurillard even goes so far as to declare that the lecture should be utterly rejected by any university that sees itself as "not enfeebled by tradition": "Why aren't lectures scrapped as a teaching method? If we forget the eight hundred years of university tradition that legitimises them, and imagine starting afresh with the problem of how to enable a large percentage of the population to understand difficult and complex ideas, I doubt that lectures will immediately spring to mind as the obvious solution."[6] In a time when there are so many effective and high-tech ways of transmitting and disseminating information, the lecture appears a pointless remnant. Its persistence, according to Laurillard, can be explained only in terms of tradition.

However, current practice tells a different story. Video and audio podcasts of talks and lectures are commonplace, with TED Talks being a staple for technologists and teachers alike. Lecture hall feedback devices (or clickers) are popular as teaching tools, and contemporary variations on the lecture range from "Pecha-Cucha" and "Ignite" talks to whiteboard demonstrations from Khan Academy. Since the rise of YouTube around 2006, new life has been breathed into the lecture, as one recent article points out: "Free online video hosting services such as YouTube have [recently] enabled people to disseminate instructional videos at [a very large] scale. For example, Khan Academy videos have been viewed over 300 million times on YouTube. Videos are [also] central to the student learning experience in . . . MOOCs . . . . These online courses are mostly organized as sequences of instructor-produced videos interspersed with other resources to disseminate instructional videos at [a global] scale."[7] The predominance of these online videos, particularly the importance of instructor-produced videos for the MOOC, puts us in an ironic situation: the latest educational and technological innovations are being used simply to create and disseminate copies of one of the most archaic pedagogical forms. Regarding MOOCs in particular, media theorist Rainer Leschke notes sardonically that they "represent a kind of *Titanic* of the lecture . . . bristling with the latest technology, yet at the same time hopelessly antiquated."[8]

Contradictions like the one pointed out by Leschke can be addressed by taking a look at the lecture as an instructional genre. As I noted earlier, examining the complexities of the history and communicative dynamics of the lecture, it is possible to show that the lecture as a pedagogical form is able to interconnect a wide range of media (originally, spoken and written word; later audio, image, and video). It is also possible to show that it reflects, demonstrates, and reinforces prevailing epistemologies or approaches to knowledge and its propagation.

The Lecture as Cultural Preservation

Laurillard and a variety of others[9] are correct in observing that the spoken word is crucial to the lecture. However, this does not mean that the spoken lecture will inevitably be superseded by new, more advanced media innovations, whether these are textual or multi-medial in nature. Instead, the lecture can be most effectively understood as bridging oral communication with writing, rather than an obstinate form of primitive residual orality.

As Laurillard's remarks indicate, the history of the lecture goes back to a time before the advent of the printing press in the fifteenth century, all the way to the

High Middle Ages (1000–1500 CE). Especially early on, this was an era when even basic textual information was quite scarce, and the capacities and resources for reading and writing were rare and jealously guarded. The form and function of the lecture closely reflected these circumstances: its function was not one of disseminating or broadcasting to large groups of people. Instead, its raison d'être was preservation. *Contra* Laurillard, lectures were less about disseminating knowledge among students than they were about rescuing a written cultural heritage from irretrievable loss and decay.

The Middle Ages was a time when knowledge and truth were seen as having been passed from God to Adam, and then through the writings of Moses and other ancients, up to the present. Knowledge and truth thus survived in the form of the Bible and ancient Greek and Roman texts. "Western thinkers," as Anthony Grafton notes, "believe[d] that they could find all important truths in ancient books."[10] Consequently, "the quest for truth," as another historian says, was "thought of as the recovery of what is embedded in tradition, whether religious or secular, rather than the discovery of what is new."[11] Without the printing press, even the most established classic text existed only in the form of scarce and divergent handwritten copies. Without printing, there was no such thing as a new or revised edition, no such thing as a publisher's errata (corrections), even no such thing as a publication process or a publication date. Simply preserving texts could be a significant challenge: "Stored documents were vulnerable to moisture, and vermin, theft, and fire. However they might be collected or guarded within some great message center, their ultimate dispersal and loss was inevitable. To be transmitted by writing from one generation to the next, information had to be conveyed by drifting texts and vanishing manuscripts."[12]

Teaching and learning were similarly conceptualized as acts of preservation rather than as the creation of new knowledge or even the re-creation of what was already known. Thus, the lecture was configured quite differently than it is today. The medieval meaning of the word lecture is to *read* or *read aloud* (from the Latin root *legere*, "to read"), and that is precisely what a lecture was: reading aloud or dictation of an authoritative text, most often the Bible or an ancient authority. One scholar writes, "Dictation provided a written record intended to preserve the living spoken word, which ultimately stemmed, not from the teacher, but from the ancient and biblical authorities and their interpreters. The students' task was to assimilate the subject matter, either by dictation or by following the professor's reading in a text in front of them."[13]

Some books were even specifically designed to fit on a podium (or "cathedra" as it was then called[14]); others were still written in *scriptio continua* (like this: withoutspacingandpunctuation), requiring vocalization in order to be deciphered.[15] So it could indeed be said that the act of reading was often an act of lecturing (a "reading aloud"), and that a lecture was almost always a matter of reading. The idea of extemporizing on one's own ideas was unknown, and in fact the lecturer could even be fined for departing from a slavish dictation of the text at hand.[16] The lecturer, therefore, was not typically seen as an individual with his or her own thoughts and insights, but rather as a conduit or channel for a tradition received from the past. Friedrich Kittler puts it this way: "Most European universities came into being as extensions of former monasteries or cathedral schools. Therefore, they always possessed from the outset a library full of Latin manuscripts. This very wealth not only guaranteed the famous *translatio studiorum* [literally 'transfer studies'] transporting classical antiquity to the High Middle Ages, but also constituted a kind of hardware, a storage device just as precious as our hard drives."[17]

There were two types of lecture: ordinary—intensive lectures given by senior professors in the mornings—and cursory—briefer and more superficial lectures given by their juniors later in the day. Documentation of university procedure of the time speaks of lectures as places where whole books or volumes were "heard." For example, one document from the University of Paris required that before the student could be "admitted to examination he shall give personal security that . . . he has heard the books of Aristotle on the *Old Logic*, namely, the *Praedkamenta* and *Periarmeniae* at least twice in ordinary lectures and once cursorily . . . the *Topics* of Aristotle and *Elenci* twice in ordinary lectures and once at least cursorily or if not cursorily at least thrice in ordinary."[18] The content of these ancient texts, as this statement makes clear, was not only inscribed by the hands of listening students; through repetition, it was also inscribed on their minds or memories.

Particularly early on in the history of the university, "the simplest way of getting [books] . . . was for the teacher to dictate the texts to his pupils."[19] University lectures were also sometimes labeled *dictate ad calamum*, meaning that they were given at a pace suitable for transcription by the audience. Verbatim student notes from such lectures would sometimes serve as the basis for further copying of the text, and later even for print publication (figure 8.1).

In the medieval lecture, then, not only did the lecturer's reading and dictation occur in lockstep; these actions were often also synchronized with student note

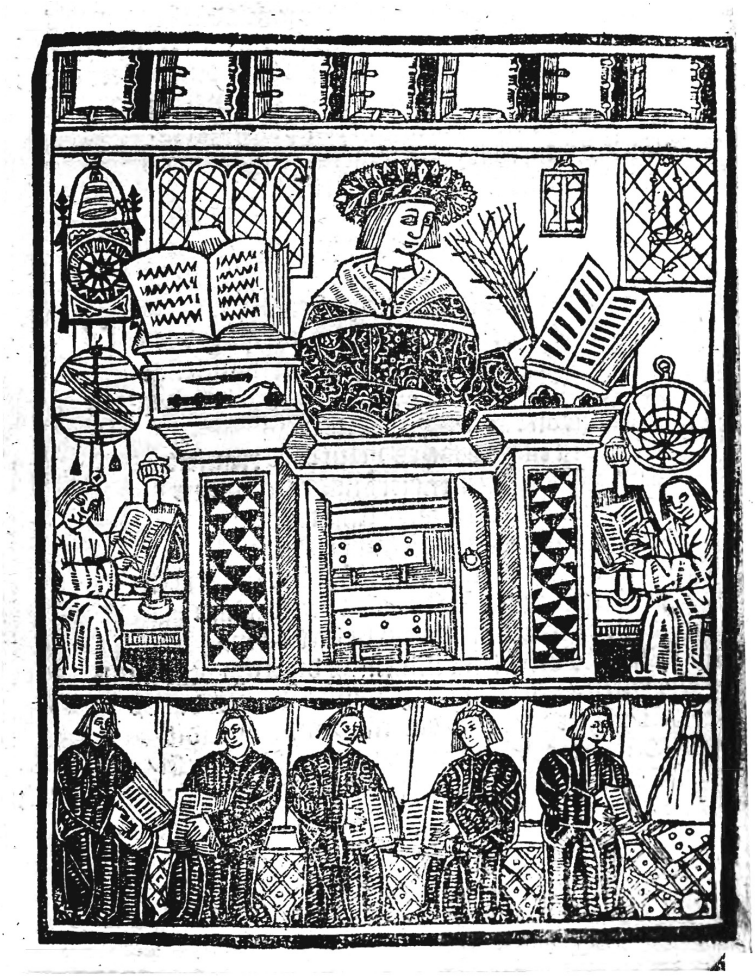


Figure 8.1. A medieval lecture in astronomy at the University of Oxford. The master holds a switch in one hand as he lectures from an open book on his desk. "The two students at his feet are making notes," according to Piltz, who also explains that the lower quarter of the engraving depicts a different scene altogether: "The five figures at the bottom . . . almost certainly represent *baccalaurei* in a practice disputation and they are showing passages in their textbooks to each other." These are bachelor's students, in other words, practicing what another scholar describes as an "oral and dialogical" debate based on "canonical texts" that were "read aloud in the lecture." Piltz, *Medieval Learning*, 170; Clark, *Academic Charisma*, 87. *Source:* Oxford Historical Society, *The Ancient Kalendar of the University of Oxford*, Archive.org

taking. In these circumstances, professors were as interchangeable as their students: lecturers were functionally comparable to conduits through which voices of the past could speak. Students, for their part, were sometimes known to send servants to take their notes for them.[20]

The Lecture in the "Gutenberg Galaxy"

Into this world of informational paucity the spread of the printing press in the late fifteenth century unleashed an era of relative abundance. As one early account exclaimed, through the printing press texts were "multiplied, as now a book is reproduced many thousandfold. Therefore if one, two, three, ten or twenty are burnt or otherwise are given up, there are still very many additional others, so that a book is never totally lost."[21] Naturally, this profusion of printed information led some to challenge the function of the lecture as a means of textual reproduction. They argued that it could no longer serve simply as a site of dictation and verbatim note taking. Professors were no longer unrivaled as sources and masters of information and learning: "Gifted students no longer needed to sit at the feet of a given master in order to learn a language or academic skill. Instead, they could swiftly achieve mastery on their own, even by sneaking books past their tutors—as did the young would-be astronomer, Tycho Brahe. 'Why should old men be preferred to their juniors now that it is possible for the young by diligent study to acquire the same knowledge?' asked the author of a fifteenth-century outline of history."[22] As Brahe's example shows, the printing press challenged the preservative and transmissive function of dictation and note taking. But that conclusion is easy to reach only in retrospect, and only in a narrow functional sense.

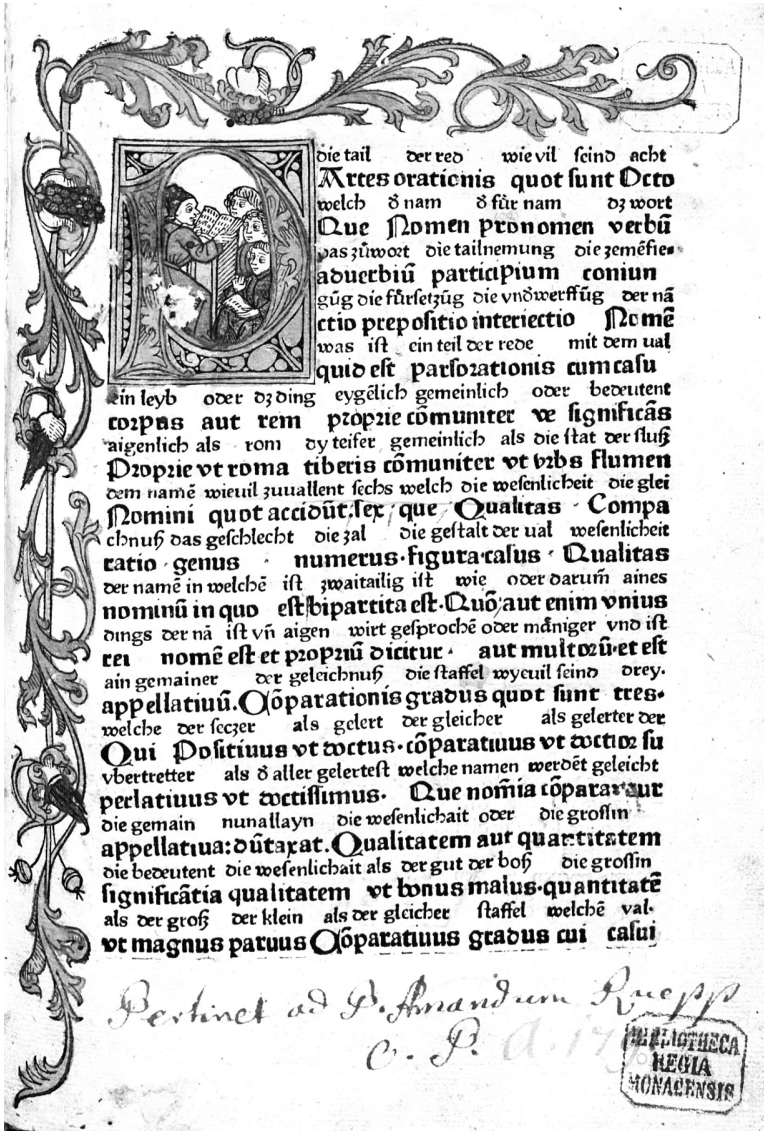
Studies of university teaching practices in the century or two following Gutenberg's invention tell a different story. For example, in a historical study of one Swedish university in the seventeenth century, Bo Lindberg explains: "The advent of printing made books available, but they were still rare and comparably expensive . . . the average student probably had just a few volumes: a Latin grammar, an edition of some Roman author, and a compendium of theology. . . . This is to say that students, well into the 18th century, were heavily dependent on the lectures of professors and of notes taken during lectures which were circulated and copied."[23] The printing press, in short, freed neither professors from their word-for-word recitation nor students from their slavish taking of notes. Note-taking students and dictating professors were still both functionally inter-

changeable: As Lindberg explains, in "its most elementary form, consisting in the mere reading of an existing text," the lecture "could be left to a student to act as a stand-in for the professor, as is actually reported from the University of Jena with a single individual" in the sixteenth century.[24]

However, it is not as if the lecture remained unchanged across Europe for hundreds of years. It is possible to trace at least one gradual shift in instructional and textual technique, one that begins well before Gutenberg and continues for centuries afterwards. This is the technique of gloss and commentary. Explanatory notes, or glosses, were written and copied into the margins or between the lines of an authoritative text, assisting the lecturer, and sometimes also the student, in his explanation, or commentary, regarding a given passage (e.g., figure 8.2).

"In the beginning," as the *Catholic Encyclopedia* notes, "masters noted down on their own copies . . . a few words by way of résumé, and as a help in their lectures."[25] Later, glosses themselves would be considered authoritative, allowing a professor to "'read' an exemplar already provided with an authorized 'gloss' which aided interpretation and itself became an object of commentary."[26] Glosses thus facilitated a move away from slavish dictation in the lecture, enabling the gradual emergence of different forms of commentary as ways of mediating between the traditional textual record and the contemporary reader and his audience. A recent study of the university by William Clark indicates a gradual shift from linear dictation to more unfettered commentary. By the middle of the seventeenth century, despite great variance in practice, dictation of original texts and glosses or commentary were competing for dominance: "A 1642 lecture plan for the Jesuit philosophy faculty at Ingolstadt, for example, set an ideal . . . the first half hour of each lecture was to be for dictation and the second half hour for glosses and exegesis. Many early modern lectures seem to have become chaotic commentaries, or remained readings aloud, dictations page-by-page of a textbook."[27] Clark goes on to say that out of concern for educational quality, the eighteenth century—a significant time of change for the university—saw a number of governments outlawing dictation altogether.

In sum, for nearly 300 years—the introduction of glosses and commentary notwithstanding—little instructional or technological innovation can be detected in the pedagogical form of the lecture. As the rest of the world was being transformed by ready access to the Bible and other print material in fields such as science, politics, and entertainment, dictation and note taking persisted, with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BIBLIOTHECA REGIA MONACENSIS

Figure 8.2. Image and "interlinear" instructional gloss or commentary in a standard "textbook" printed in the fifteenth century. While the image (*top left*) likely reflects classroom arrangements for the use of the book, the text provides very specific options for reading and study. Latin words are printed in large type, with prompts and transliterations of specific terms or phrasings in more informal German in between. "The interlinear version is not to be read horizontally, sentence by sentence, but vertically, so that each German word is related to the Latin word on the line under it." Henkel, "Printed School Texts," 215. Special thanks are due to Dr. Henkel for his assistance with this image and its explication. *Source:* Image from Aelius Donatus, *Ars Minor* (With German Interlinear Gloss), Augsburg 1481

some variance in practice, largely as if nothing had happened. As the Renaissance replaced God with man in culture, and the Reformation exchanged the icon for the book in religion, the lecture remained essentially what it had been in the Middle Ages. The revolution of the printing press and the changes it wrought in the information ecosystem did not mark a particularly sharp transition of any kind for lecturing and note taking.

The Lecture as Authorial "Spirit"

As indicated, the last years of the eighteenth century marked a period of significant change for the university. It is not only possible to pinpoint this revolution in time but also in space, and even to place the focus on one person—Johann Gottlieb Fichte at the University of Jena: "In the 1790s in the University of Jena Fichte became one of the first German professors who began officially lecturing without a set text. . . . Fichte and other Romantics began lecturing on their own work without any pretense that that they were glossing a text or recapitulating a tradition. . . . Departure from an actual or even virtual textbook as a basis for lecturing constituted the ultimate break with the sermon [or medieval lecture]."[28]

The lecture, in short, was no longer about the authority of the text; it was about the authority of the lecturer. Neither the lecturer nor the student was seen simply as a conduit for a tradition received from the past; their task was also not even a kind of commentary or disputation on this tradition. The medieval practice of interchangeable lecturers reading slavishly from the same authoritative texts lost its meaning and value. Instead, what was meaningful and valuable was one lecturer speaking his mind and standing as the originator of his speech—as the author of his own spoken thoughts and words. This was the climax of the romantic period, and like his fellow romantics, Fichte saw the letter or written word as all but dead, and he took up the spoken word as his métier.

Fichte was a romantic philosopher, a university administrator, and the author of a grand work known as the *Wissenschaftslehre* (the system or teaching of philosophy or knowledge). He was also an outstanding lecturer and public speaker (figure 8.3). He was even described by his fellow romantics Goethe and Hegel as "extraordinary" and "rapturous." The theologian Friedrich Schleiermacher recognized Fichte's "splendid gift of clarity," but dismissed his "rhetoric" as only serving purposes of "fomentation" and "defamation."[29] It was also reported that Fichte could lecture from a complete text as if he were speaking freely and that he could speak fluently and at length from a single page of notes. Fichte criticized

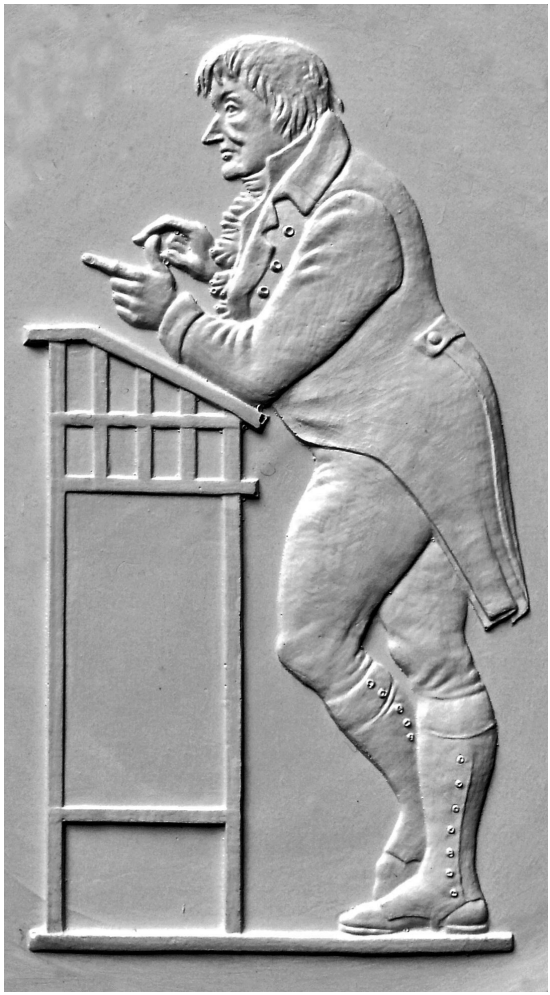


Figure 8.3. A commemoration of Fichte lecturing; bas-relief modeled on a sketch from Fichte's own time. The image was created in East Germany in 1990, months before the country's dissolution, to commemorate the 175th anniversary of Fichte's death. *Source:* Wikimedia Commons

the university and its lecturers as being utterly redundant at a time when books were both plentiful and accessible: "Books have become extremely common . . . making it easier to disseminate one's [ideas] in writing than through the spoken lectures. Even though there is no branch of study for which there is not an over-

abundance of books, people still feel that the university needs to recapitulate the entire world of books once again—to *recite* what lies printed on the page for all to see."[30]

As Fichte was writing these lines, the world of books and print was undergoing a second upheaval. Until 1799 the wooden, manually operated printing press had changed little from Gutenberg's original configuration. This meant that printing and bookmaking were essentially a craft rather than an industry. But with the invention of the metal-platen press in 1800, the speed of the press doubled. And as the century wore on, printing was effectively industrialized, with the speed of production increasing geometrically, most notably when it increased tenfold following development of the cylinder press in 1811.[31]

Fichte's observations about the abundance of books and the changing roles of both lecturers and universities were not only timely; they were also similar to those of the seventeenth-century figures Comenius and Rousseau. Fichte's "theory of knowledge" (*Wissenschaftslehre*) starts with the self or the "I," which he sees as representing itself through its own thought, its own existence, and its own freedom, self-reflection, and self-awareness. As one commentator put it, Fichte's self was not so much "a static thing with fixed properties, but rather a self-producing process."[32] Fichte called this self-producing reflective awareness of oneself and the world around one *Geist*: spirit, thought, or intellect. In a lecture titled, "Concerning the Difference between the Spirit and the Letter within Philosophy," Fichte speaks of how, through a potentially infinite series of self-reflections, the spirit and mind could become transcendental and absolute. He points to the possibility of "various *levels* of reflection: I can reflect upon my own act of representing, I can reflect in turn upon my act of representing this act of representing, and I can continue to reflect in this manner indefinitely . . . until one has generated a pure, general logic. . . . Through the least self-reflection one can once more lift oneself into the realm of pure reason and pure truth, and one can dwell and wander in this higher world—at least spiritually."[33]

Fichte conceived of the self not only in terms of its reflection but also its action. And what is remarkable is that he generated significant parts of this theory not while sitting in his study, but while "in action," while holding forth at the lectern. Media theorist Kittler notes that according to Fichte, "Lectures must say precisely those things which do not exist in any book, and the other way around. Consequently, there is no textbook that Fichte used . . . as a basis for his lectures in Jena."[34] According to his own philosophy, Fichte can be said in a sense to have produced *himself* as a self-producing process through his articulations at the lectern.

In doing so, he also brought into existence his theory of precisely how this same production of self and knowledge can and should occur.

Fichte thus not only theorized the system of philosophy; he effectively enacted it. Of course, this was to happen, as Fichte himself said, as a "spontaneous" expression of spirit, rather than through "unhelpful" "empty, dead letters." The spirit is the soul, the psyche that is ultimately intangible and immaterial. Still, it is something that can be "conjured up" and spread by virtue of the speaker's ideas, emotion, conviction, and even "rapturous" rhetoric. Lecturing on the spirit and the letter, Fichte explained: "I set before you a product, into which I believe I have breathed a few ideas. But I do not give you the ideas themselves, nor can I do so. I give you the mere body. The words which you hear constitute this body. Taken in themselves, my words are no more than an empty noise, a movement in the air which surrounds us. You place a meaning in these words *for yourself*, just as I place a meaning in them *for myself*."[35] Each student must in other words develop something tantamount to his own *Wissenschaftslehre*, using his self or "I" as his own self-positing starting point. But this learning was not entirely personalized learning: "No teacher can make his teaching completely individualized, and no teacher should do this. Everyone must discover for himself *how* something is construed in accordance with his own manner of thinking and how this is to be squared with what he previously considered to be true and settled."[36]

It would not at all be a mistake to hear distinctive echoes of Fichte's system of philosophy in today's constructivist psychology (see chapter 3), which sees individual students as rediscovering and constructing knowledge for themselves—all based on prior "knowledge construction" work. Constructivism is deeply embedded in the romantic tradition in education. Central to both philosophies is the conviction that learning is a naturally occurring process of individualized discovery based on one's own personal experience. It is perhaps ironic, therefore, that Fichte and his romantic contemporaries saw this learning as exemplified in the lecture, via the "sage on the stage"—a position now so often seen as anathema to constructivist education.

Like Rousseau and Pestalozzi before him, Fichte privileged the spoken word over writing. But he did not see in it simply a more authentic and natural form of expression. Instead, as indicated above, he saw it as being the best way to evoke and excite "spirit" as a kind of emotional flicker and ignition, as a spark that "comes from somewhere invisible to you and to all mortal eyes." In ending the

first of his three lectures on the difference between spirit and letter, Fichte said: "I conclude today's lecture [with] the wish that, unnoticed by me, a great deal of spirit may be found among you, and that from time to time I can succeed in scattering in your souls fiery sparks which will arouse and stir them."[37] Fichte, in short, was an exemplary media theorist *avant la lettre*. He articulated a consistent theory of communication in relation to the media of text and speech—and brought this into connection with a fully articulated theory of knowledge and self.

However, as with the great romantic figure Rousseau, the institutional application of Fichte's sweeping claims and deeds was left to be worked out by others whose names have since become familiar in the annals of university history. One of these figures was linguist, philosopher, and educational reformer Wilhelm von Humboldt. Together with other romantic academics, Humboldt designed and founded what is known today as the Humboldt University of Berlin, an institution which has been called "the mother of all modern universities:"[38] Founded on principles of freedom of faculty research (also known as academic freedom), freedom of students to choose their areas of study, the relative autonomy of the university from the state, and the founding unity of teaching and research, Humboldt University of Berlin was a model in the establishment of institutions like the University of Chicago, the University of Toronto, and Johns Hopkins University. In all of this, the lecture and the lecturer played a central role, which Humboldt described in terms of the fundamental unity of instruction and investigation: "For unconstrained oral communication to an audience, which includes a significant number of intelligences thinking in unison with the lecturer, inspires those who have become used to this mode of study just as surely as does the peaceful solitude of a writer or the less institutionalised activities of the members of an academy."[39]

Lecturing, according to Humboldt, could be just as inspiring for the scholar as his research and writing. In fact, the academic lecture for Humboldt became almost a kind of communal "scaled" or "massified" version of research, writing, and investigation. All of these activities for Humboldt, furthermore, were not about preserving past knowledge for future generations, but about generating and disseminating new knowledge, as one historian observes: "The task for the lecturer in this new age was thus not to pass on what had been handed down, but to embody the creation of new knowledge. . . . Those who were to be capable of guiding others had themselves to produce new knowledge. It was here that the

axiom was postulated as to the irrefutable connection between teaching and research that is nowadays associated with Humboldt's name."[40]

Humboldt's reference to "a significant number of intelligences thinking in unison with the lecturer" may sound familiar; it echoes Nietzsche's widely quoted reference at the outset to one speaking mouth and many listening ears and writing hands. It almost seems as if Nietzsche had Humboldt in mind in writing about the university lecture. However, instead of focusing on intelligences thinking in unison, or of Fichte's sparks and flammable spirits, Nietzsche's vision of the university was of a kind of gigantic apparatus, or what he goes on to call a "University culture machine":

> There you have, to all appearances, the external academic apparatus: there you have the University culture machine [*Bildungsmaschine*] in action. The proprietor of the one mouth is severed from and independent of the owners of the many ears; and this double autonomy is enthusiastically called "academic freedom." What is more, by increasing this freedom a little, the one can speak more or less what he likes and the other may hear more or less what he wants to—except that, behind both of them, at a carefully calculated distance, stands the State, wearing the intent expression of an overseer, to remind the professors and students from time to time that *it* is the aim, the goal, the be-all and end-all of this curious speaking and hearing procedure.[41]

If you sense irony and even sarcasm in Nietzsche's characterization, you would be right. Nietzsche—not yet wracked by near-blindness and pain—was at this time a young university professor and rising academic star. However, his conception of the university was much more cynical and pessimistic than that articulated by his romantic predecessors earlier in the same century. The university for Nietzsche was an apparatus, a machine, rather than a place where spirits are aroused or intelligences think in unison. It was the state, rather than the lecturer and his audience, who then "places meaning" in the words of the lecturer, and it was the state who determines the final value and significance of those words.

But what led Nietzsche to produce his deeply cynical vision of the university? As indicated in chapter 7, one thing that changed, at least in Nietzsche's own experience, was the appearance of new electromechanical media forms and technologies. These included not only Nietzsche's own typewriter, but—over the course of his lifetime—the advent of both the telegraph and the phonograph. Of

course, none of these forms made the lecture obsolete, but as I show in the next chapter, they were ultimately influential in its being recast from a spontaneous authorial expression to a much more calculated performance, aiming only at the illusion of spontaneous expression.

Chapter Nine

The Lecture as Postmodern Performance

> My relationship with the people there [in the lecture hall] is like that of an actor or an acrobat. And when I have finished speaking, a sensation of total solitude . . .
>
> —MICHEL FOUCAULT, 1973

Lectures are all but indispensable to the intellectual and cultural history of the twentieth century. Consider Sigmund Freud and his 1917 *Lectures on Psychoanalysis*. We still draw on the terminology of these lectures every day—when we speak of fixation, free association, and of course, the Freudian slip. The later decades of the century produced many other important examples, such as the inaugural "Reith Lectures," given by Bertrand Russell (figure 9.1), and the lectures of Michel Foucault over a period of 11 years at the Collège de France.

There is an important difference, however, between these last two examples and any other oral teaching I have mentioned so far in this book: the lectures of Russell and Foucault are well-known today not primarily because of students' faithful note taking, or even thanks to the lecturer's own typescript. Instead, they came into being because of electromechanical audio and video media. Russell, who has recently been described as "the first intellectual star of the modern media age" made many appearances on the British Broadcasting Corporation (BBC), and was keen to broadcast his ideas to a wider audience.[1] Foucault, as I show below, viewed his audience's eagerness to electronically record his words[2] with equal measures of mild irritation and indifference.

However, these media technologies inevitably leave their traces on the nature and function of the lecture as has happened in many ways in the twentieth century—first with the emergence of radio and film in the early decades, then with the introduction of television (and consumer audio recording) mid-century,

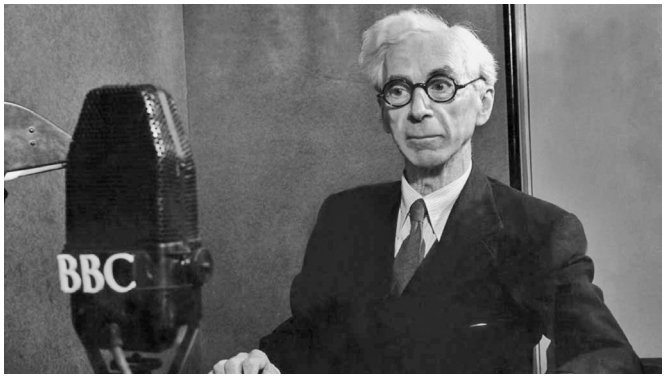


Figure 9.1. Philosopher Bertrand Russell eyes the microphone conspicuously at one of his many BBC lectures. Russell's lectures had notable political impact, despite complaints that he "had a bad voice," and that he "read us a lecture" rather than giving a more informal "talk." Ince, "Bertrand Russell." *Source:* BBC, used with permission

and finally, with the advent of digital and networked multimedia that still define our era today. This recent history, and the theory and practice it provoked, is the focus of this second part of my case study of the lecture and its media. In it, I examine the lecture as a performance, as an event—even as a kind of pedagogical illusion. As was the case with the medieval and romantic lecture and the romantic (and Reformation) textbook, the modern lecture also serves as an exemplary illustration of various configurations of both knowledge and the self.

To begin, though, I go back to the lectures of Foucault. One witness to his famous two-hour talks at the Collège recalls: "When Foucault enters the amphitheater, brisk and dynamic like someone who plunges into the water, he steps over bodies to reach his chair, pushes away the cassette recorders so he can put down his papers, removes his jacket . . . and sets off at full speed."[3]

Foucault, like Fichte, was an electrifying speaker. But unlike Fichte, you can judge for yourself by searching online for archived clips taken from cassette recordings and other media, some of them in English. The availability of such recordings—their virtual "broadcasting" on the Web—offers an enormous advantage for students and researchers alike. We all get a chance to relive the experience of Foucault operating "at full speed."

But at the same time, these recording devices meant that Foucault had to contend with something that Fichte—or for that matter Nietzsche or even Socrates—never had to face. What awaits Foucault at his podium is not a faithful

student-stenographer like Plato, nor the many listening ears and writing hands described by Nietzsche. Instead, Foucault is confronted, much more immediately and obtrusively, by an array of cassette recorders that he needs to "push away." How do the slowly turning wheels, the blind and indifferent operations of these silent machines, affect the lecture? What does it mean that their recording is not of Foucault's words or thoughts, but rather the electromechanical registration of the sound of his voice—the "movement in the air which surrounds us" which Fichte so contemptuously dismissed? And what does it mean that this record, which can neither be read nor pored over, is generally considered superior to even the most faithful note writing of Foucault's students? The witness quoted above recalls further:

> At 19.15 [after exactly two hours] Foucault stops. The students rush toward his desk, not to speak to him but to stop their cassette recorders. There are no questions. In the pushing and shoving, Foucault is alone. Foucault remarks: "It should be possible to discuss what I have put forward. . . . However, [a] . . . question never comes. The group effect in France makes any genuine discussion impossible. And as there is no feedback, the course is theatricalized. My relationship with the people there is like that of an actor or an acrobat. And when I have finished speaking, a sensation of total solitude . . ."[4]

Foucault attributes this sensation of solitude and his role as a theatrical performer to the "group effect in France"—that is, his status as a French intellectual celebrity. And this is also likely a time when prominent intellectuals and lecturers encountered certain aspects of celebrity for the first time.[5]

However, I believe that Foucault could also have thought of this situation in a slightly different way. Were he not so inclined to dismiss McLuhan and his message concerning media, he might have focused more on the "message" presented by the recording media so obtrusively arrayed around him. In other words, he could have looked to the new medium of the recorder and its message. This message is indicated indirectly in the passage above, suggested in the students' "pushing and shoving" and their rush "toward his desk" at the end of his lecture. These lecture attendees apparently have no questions in mind for Foucault, no expectation of dialogue. The fiery sparks, the thinking in unison, the discovery of the meaning of his words for oneself, for one's own manner of thinking, are nowhere in evidence. The one point of urgency is instead to retrieve one's recording. As happens so often today, the experience of a singular event seems to be the experience of capturing it on some sort of recording device.

And one could also say that Foucault, whose observation of the self in society was always acute, is indeed an actor: Without his lines or his "act" to fall back on, the presumption seems to be that he has nothing to say; in a space filled by an eager audience, pushing and shoving, he is left only with "a sensation of total solitude." But does the lecture now only amount to holding forth to an audience apparently more concerned with recording than listening? Might there be twentieth-century thinkers who have theorized, as Fichte did in his own time, on the difference between "spirit and letter" in the lecture, or on the pointlessness of merely reciting what "lies printed on the page" (or on the PowerPoint slide) "for all to see?" What lessons can be learned from reflections on the lecture in the technologically eventful twentieth century?

Prominent thinkers, including Jacques Derrida, Pierre Bourdieu, and Michel Foucault himself, have indeed addressed the significance of the lecture. They have done so in the context of lectures, often inaugural or commemorative in nature, in which they address their own role or function at the podium, even if just briefly.[6] However, these figures, all known for their theoretical attentiveness and sophistication, provide no sustained consideration of page versus podium or audio (broadcast) versus amphitheater. Instead, they sidestep the question of the lecture in particular in favor of the generalities of "language," "discourse," or "writing" as a whole. Foucault sees the lecture simply as an instance of (mostly written) "discourse."[7] Bourdieu views it in terms of (mostly unwritten) aspects of power, practice, and ritual.[8] Derrida, for his part, sees the lecture as yet another instance of generalized forms of speaking, writing, and even thought—what he labels "arche-writing" (see chapter 1).[9]

The Last 100 Years: Radio, TV, and the Typewriter Ribbon

The story of the lecture in the twentieth century is more eventful and colorful than gray monolithic categories like "discourse" or "arche-writing" suggest. As often happens when it is articulated *avant la lettre*, the story line seems scattered. But the story provides a perceptive commentary on individual media forms as they were gradually integrated into cultural life over the course of the century. For example, the radio, like any new medium, was initially greeted with considerable optimism: it provided the widest variety of audible expression, including the lecture, to reach the widest range of listeners. Walter Benjamin, as mentioned above (chapter 6), was one of the first to theorize about the effects of film and radio. Here Benjamin remarks on the specific nature of a radio-broadcast lecture: "Never has a reader snapped shut a book he has just begun as willfully as listeners switch off the radio

after the first minute of some lectures. It is not the remoteness of the subject matter; this would often be a reason to listen for a while, uncommitted. It is the voice, the diction, the language—in short, too frequently the technological and formal aspect makes the most interesting shows unbearable."[10] Detailed aspects of the personal performance, "the voice, the diction, the language," Benjamin explains, can mean the difference between the success and the all-too-frequent failure of the broadcast lecture. And this failure, when the listener decisively switches off the device, Benjamin seems to suggest, is more irreversible than simply putting a book aside. Benjamin is saying, in short, that the medium and the form of the broadcast trump any message it is transmitting.

If radio was greeted with optimism in education, television—breathlessly anticipated as "radio with its eyes open"—brought with it a veritable tsunami of excitement and funding. The Ford Foundation spent over $100 million on fostering and studying the educational use of this new medium. Even Marshall McLuhan and his colleagues got in on the act. They used Ford Foundation funding to investigate a question that has since been studied dozens if not hundreds of times: the educational effects of an academic lecture given to students in a lecture hall compared to the same lecture delivered on television. In McLuhan's case, print, radio, and film were also included in the analysis. A lecture was delivered simultaneously to different groups via these different media, and the students' comprehension was then tested. McLuhan's colleagues were all confident of the results: "About twenty of [us] . . . placed bets on the outcome," one recalls, "Academics all, we each seriously thought print would win."[11] The result, as the *New York Times* announced, was that "video" was found to be a better teacher: "Television is a first-class teacher, easily surpassing books and its elder cousin, radio," the *Times* reported. "When the students were tested, the television group rated first, with the radio and [print] manuscript students scoring second and third, respectively."[12] This finding only served to confirm the great expectations for television as a medium for instruction. New academic journals were founded on the subject, studios were built on university campuses, and further waves of televisual change were eagerly awaited.

However, amid all this excitement, few seemed to notice that television resulted in a rather different, more "intimate and personal" experience than the lecture hall. Television placed very different demands on the lecturer than the lecture hall did, and many seasoned professors found it difficult to adjust. For example, the *New Scientist* published a number of pieces related to televised biology and medicine lectures in the early sixties. One of these observes that "paradoxically,

although the purpose of television is dissemination of information to a [large] number of people . . . the image of a speaker on the two-dimensional screen . . . creates] a personal relationship with an individual viewer. The most effective television teacher, in effect, speaks to one viewer and uses his personality to communicate with a single individual, however many there are in the total audience. This is a completely different technique from lecturing."[13]

The technique requires careful preparation, if not also professional training, as the *New Scientist* warns: "It is well known, and frequently to be observed on normal television, that amateur performances border tremulously on the brink of farce." The author recalls one lecture in particular, given by several doctors, each in turn: "The camera then flashes on to [another] doctor. By chance, the doctor is looking particularly vague at that moment. His face lights up only when he begins to speak. He speaks well enough, perhaps, but his audience spends the first few minutes getting used to his eyebrow twitch . . . When this no longer seems odd[,] another doctor, by chance, is sitting in his place. Different eyebrows move differently, and are equally absorbing."[14] The article concludes that those "who are thinking of using television as a medium for lectures had better take some lessons in television talking." A special set of skills is needed to avoid eyebrow twitches or to light up and speak on cue in a television studio as if to a single individual. These skills—inherent qualities of being televisual, telegenic, and telekinetic—are essentially acting skills.

A similar set of concerns was raised again with the advent of online learning. In the heady days before the dotcom crash, it was not uncommon to propose that actors—or only "popular" teachers—give lectures intended for online students. One article from 2000 speculated that it "wouldn't take much" to post "video lectures featuring master teachers, or lectures written by textbook authors and presented by trained actors."[15] Video recordings of these lectures could then "provide serious competition with even the best lecture hall course." Later, with the wild popularity of MOOCs, the topic of actors replacing professors has come up again, this time even from those leading large-scale online course initiatives. For example, Anant Agarwal, MIT professor and now CEO of the MOOC consortium edX, speculated in 2013: "From what I hear, really good actors can actually teach really well. So just imagine, maybe we get Matt Damon to teach Thévenin's theorem [for electronic circuits]. . . . I think students would enjoy that more than taking it from [me]."[16]

What does this emphasis on style and personality, on eyebrows and diction, tell us about the lecture today? As Michel Foucault noted decades ago, the

lecture has now become theatricalized. The lecturer is no longer simply one speaking mouth addressing many listening ears and writing hands, as Nietzsche said. Thanks to recording technology—from audio to television to YouTube—the lecturer, typically speaking to a microphone or a camera, ultimately addresses a single student at a time, the single audience member ideally addressed as if in an intimate and personal relationship. "Technological and formal aspects," as Benjamin perceptively observed of radio, also are paramount for video.

What can help us further understand the "personal and intimate" yet "theatricalized" relationship between lecturer and viewer? The deeply theoretical "lectures on the lecture" by prominent intellectuals mentioned above provide little guidance on their ostensible topic. However, there is one exception—it comes not from a French or German theorist, and it was delivered well before the era of YouTube and the MOOC.

The published text of a 1976 lecture by Canadian-American sociologist Erving Goffman is titled simply "The Lecture," and it gives careful consideration to the media of the spoken versus written word while acknowledging the significance of other media forms as well. It is perhaps no coincidence that the central metaphor in Goffman's sociology is that of theater. His theory focuses on the "dramaturgical self," a self that performs in a role as one might act on a stage. Thus Goffman is boldly postmodern in redefining the self: "The self is *not* an organic thing that has a specific location," he emphasizes, "whose fundamental fate is to be born, to mature, to die."[17] It is not a self in the sense that we speak every day of our own biographies or professional or personal identities. The self, Goffman continues, "is instead a dramatic effect arising diffusely from a scene that is presented."[18] Significantly, Goffman also speaks of the self as "multiple." The self, like the actor, will have various roles. However, unlike most actors, the self can perform some of these simultaneously or in rapid succession, as is the case in the contemporary theatricalized lecture: The lecturer is a personable and telegenic performer for the cameras one moment and an intent researcher in a quiet archive or sterile laboratory the next. She plays yet another role on her public Website, which would list her publications and accomplishments. This third role is one where she is someone with a particular career, professional history, and reputation; it is a self whose achievements and statements are listed for all to see.

The idea of the self as multiple in this sense is crucial to Goffman's analysis of the lecture in his 1976 presentation. Goffman emphasizes that one self in particular appears as most important or "principal" while at the lectern:

> At the apparent center will be the *textual self*, that is, the sense of the person that seems to stand behind the textual statements made and which incidentally gives these statements authority. Typically this is a self of relatively long standing, one the speaker was involved in long before the current occasion of talk. This is the self that others will cite as the author of various publications, recognize as the holder of various positions, and so forth. . . . And he is seen as the "principal," namely, someone who believes personally in what is being said and takes the position that is implied in the remarks.[19]

This principal self for the lecturer would be the self that is today portrayed on department Websites and networks like LinkedIn or Academia.edu. In Goffman's time, this self was almost certain to be entirely textual in nature, but today images, audio, and video may all be a part of this particular self. As Goffman puts it, this "textual" self is one that "can be displayed entirely through the printable aspects of words[, as] an emanation from the text itself." It follows that this textual self is typically also the author of the words she or he speaks in the lecture. However, as Goffman later makes clear, this authorial self is one that plays a crucial role in advance of the lecture, while preparing rather than delivering it. In addition, the scenario where actors deliver lectures to vast numbers of online students provides a situation where another self, both literally and in Goffman's expanded sense, would be involved.

A second self is indispensable to the lecture—the self as animator: "He who delivers a talk is obliged to be his own go between," Goffman explains, "splitting off a self-as-animator who can speak" actively to his audience. This self, Goffman continues, is "the person [who] can be identified as the talking machine, the thing that sound comes out of."[20] But this "talking machine" is much more than just a vocalizing instrument. It is this self who can be "intimately responsive to the current situation," and it is this self who is responsible for effectively enacting whatever may have been planned for the lecture. This self is able to venture well beyond the text, for example, in offhanded remarks and asides,[21] and often in opening and concluding the lecture. It produces a type of speaking that Goffman refers to as "fresh talk": "In the case of fresh talk, the text is formulated by the animator from moment to moment, or at least from clause to clause. This conveys the *impression* that the formulation is responsive to the current situation in which the words are delivered."[22] This self-as-animator sometimes takes over completely from the textual self when it extemporizes or ad-libs at length, when it comes "close to finishing a segment without knowing yet what in the world the

next will be, and yet be confident of being able to come up with . . . something that is grammatically and thematically acceptable."[23]

In the optimal lecturing scenario all three selves appear as one. "Animator, author, and principal," as Goffman explains, all act as "the same person," forming a kind of "three-sided functionary." Successful lecturing thus "heals a split" between the various selves that the lecture itself requires or implies. The self that is addressing and responsive to the occasion should be indistinguishable from the one that is based on the text. This effect is achieved, according to Goffman's lecture, as a kind of trick or sleight of hand: "In our society we recognize three main modes of animating spoken words: *memorization, aloud reading* (such as I had been doing up to now), and *fresh talk*. In the case of fresh talk, the text is formulated by the animator from moment to moment, or at least from clause to clause. Fresh talk is perhaps the general ideal and (with the assistance of notes) quite common. [. . . Still] a great number of lectures (because of my incompetence, not including this one) depend upon a fresh-talk *illusion*."[24]

The ideal for the lecture, in short, is to create an illusion, the result of a kind of trick that is accomplished, Goffman explains, through the use of media technology. "Your effective speaker is someone who has written his reading text in the spoken register; he has tied himself in advance to his upcoming audience with a typewriter ribbon."[25] The lecturer, in other words, makes use of writing and editing skills to be able to speak to his or her audience in a way that is as engaging and even conversational as possible. Parts of the resulting typescript may be memorized to further enhance this illusion, but in a long-standing tradition, "aloud reading" remains "a frequent mode of delivery," as Goffman says. And in reading aloud, what the lecturer strives to create is only the impression of spontaneity and naturalness. The speaker in this way is able to appear as if she were transparently transmitting her own thoughts to the ears and minds of her audience.[26]

Goffman's promotion of the use of "fresh talk" in the lecture may on the surface seem to echo the romantics' affirmation of the spontaneous expression of spirit in the university lecture: both uphold the ideal of a kind of "unconstrained oral communication to an audience" as the ultimate goal for the lecturer. The lecture is to be unconstrained, of course, not only by the words and ideas of others, but even by detailed notes or scripts. However, Goffman's use of the word "illusion" makes a great deal of difference. After all, the final and paradoxical goal of Goffman's ideal lecture and lecturer is to give only the *appearance* of "fresh talk"—the illusion of a spontaneous connection between one's topic and one's

audience. Indeed, all of the main points of the romantics are significantly qualified and limited in Goffman's account.

First, there is no single, unifying, animating spirit that brings together research and teaching, thought and speech, speaker and audience—no unified self from which sparks fly to light fires in other's souls. Instead, there are multiple selves—textual, authorial, and animator—each with different, highly specialized roles. Second, there is also no grand, unified *Wissenschaftslehre* that can be articulated through the insights as these selves are synchronized and coordinated at the podium. Instead, even the most monumental lecture is only a comparatively small addition to a much larger edifice of doctrine, evidence, or discourse.[27] Third, unlike the romantics, Goffman effectively disconnects the lecture from the spontaneous generation of new meaning and knowledge: "A great number of lectures," he says, depend on "a fresh-talk *illusion*"—something very different from Fichte's fiery but spiritual sparks and von Humboldt's many "intelligences thinking in unison." Ultimately, for Goffman it is media, specifically the typewriter and the typewritten word, that help make the "fresh talk" illusion attainable. The lecturer is to use these tools skillfully and methodically to craft, check, and revise her lecture well in advance to ensure that the delivery of its words can be as direct, responsive, and even "spontaneous" as possible.

Today, of course, Goffman's typewriter and ribbon have given way to a panoply of devices and media technologies, from word processor and printer to PowerPoint, bulleted lists, and speaker's notes. In the most sophisticated podcast or videocast presentations, this range of media and bag of tricks is greatly enlarged, extending from careful audio and video editing to teleprompting techniques and overdubbing.

The Future of an Illusion

What does all of this mean for education? My account of the history of the lecture from the medieval cathedra to the "fresh talk illusion" highlights both continuities and changes and suggests that the persistence of the lecture as a pedagogical form is hardly a matter of tradition and inertia. Instead, this account highlights the pivotal role played by the lecture as media forms and cultural realities change around it. The lecture as a mediatic combination and pedagogical form can be said to operate as a powerful but flexible middle term connecting media to educational purposes and priorities. How it has performed this function over time says something about education as the construction, circulation, and regeneration of knowledge. It is also indicative of changing epistemologies

or "knowledges" themselves. Moreover, the lecture as a form can be used to trace fundamental shifts in the ways that the self—and its relation to knowledge—is constructed or conceptualized. In this concluding section, I look at each of these points in turn.

First, from the age of the manuscript to the era of the Internet, the lecture is inextricably bound with communication technologies. But no matter how sudden or obtrusive their appearance might be, these technologies have not single-handedly driven or determined the way the lecture has been configured and reshaped. Media technologies can significantly predate or follow long after related changes are observed in the lecture. For example, it took 350 years after the invention of the printing press for the lecturer to be freed from slavish dictation and commentary. At the same time, Erving Goffman can be said to have anticipated the incarnation of the lecture in the age of MOOCs and YouTube by almost 50 years. And yet, Goffman's observations reflect what was already becoming clear from lectures broadcast on radio and TV through much of the twentieth century. The lecture as a form both reflects and finds itself reflected in media technologies and the way they are conceptualized and used. In short, it is not the lecture that is rendered obsolete by a new media technology, but rather, the new technology that eventually finds a way of being adapted to this flexible, perennial form.

In her forceful critique of the lecture, Diana Laurillard dismissed its "narrative form of the ancient oral cultures." However, as I argued in chapter 7, forms of oral engagement such as the lecture (or, for that matter, the seminar or the Socratic dialogue) are not simply done away with because new media forms come to the fore. McLuhan was wrong to insist that the "sheer quantity of information conveyed" by new media, on its own, would render the school "an obsolete detention home."[28] Instead of being replaced or rendered obsolete, the spoken word that lives at the core of the lecture is complemented, augmented, and reconfigured by new technologies. Conditions of print culture can be said to have gradually freed the lecture from the function of information preservation. And through the increasing use of commentary and finally the breakthrough of the romantic lecture, this pedagogical form was eventually able to be construed as an expression of the position of the individual lecturer, a direct address to his or her audience. The subsequent introduction of audio and video aids for the lecture have further enhanced the lecture's primarily oral delivery. These technical aids are in effect arrayed around the lecturer and the lecture in support both of her and of her performance of the lecture. They sustain and reinforce the lecturer's posi-

tion as the authentic origin of her own words. At the same time, the very artificiality of these media forms and technologies can be said to have led to an emphasis on the artificiality of the oral delivery or performance of the lecture.

The romantic incarnation of the lecture is what we still might want to believe this pedagogical form is or should be today. Like romantic understandings of language and knowledge itself, the conceptions of the lecture around 1800 emphasize passion, expression, and motivation, rather than rationalist deduction, calculation, and encoding. The romantic lecture places the presenting self at its center and sees this self as the simultaneous union of thought, spirit, and speech. Centuries earlier, a "good lecture" would have been one that enabled the contents of an ancient text to be effectively imprinted not only *by* the hand of the student, but also *on* that student's memory or mind. However, in the romantic era, the lecture ultimately consisted of "unconstrained oral communication to an audience," enacting and embodying the creation of new knowledge—even a complete system of knowledge—in the presence of one's students.

Advice for lecturers or speakers, whether for TED Talks or large lecture halls, reflects these 200-year-old romantic emphases clearly: "You cannot inspire others unless you are inspired . . . enthusiastic [and] passionate . . . yourself," as one article on TED presentations instructs.[29] Teachers "lecturing to large groups" are similarly urged to express their "passion and enthusiasm for the subject," and to take opportunities to tell "students why they are personally interested" in the topic, and to link it to their own "personal research."[30] The TED presenter is advised to cultivate an authentic, even personal connection with the audience—to "deliver the presentation as comfortably as having a conversation with a close friend."[31] Strikingly reminiscent of Fichte's aims, the vaunted ambition of TED Talks is nothing less than to "ignite a movement," to scatter "fiery sparks which will arouse and stir" their virtual audience. Despite the attractiveness of the romantic model in our media-saturated postmodern world, Goffman's notion of acting and illusion is still undeniably dominant. The YouTube or podcast lecturer must somehow tie herself to her audience, not only by careful script preparation, but also through extensive rehearsal. Advice for TED presenters, for example, is to "practice relentlessly" and to consider the example of one celebrated TED Talker who "rehearsed her presentation 200 times before she delivered it live."[32]

When the lecture is regarded as an exhaustively rehearsed performance, rather than an authentic expression of the soul or a careful dictation of sacred truths, the self or selves that function and are positioned within it also appear rather differently. Unlike the romantic lecture, where thought, spirit, and speech

are seen as unified in the lecturing self, the self in the medieval lecture can be thought of as a single function: a channel for authority and truth from the past. Precious handwritten manuscripts were transmitted word for word through lectures, to be reproduced by faithful teacher recitation and student writing and memorization. Insofar as they were both interchangeable—with professors sending students to lecture and students sending their servants to take notes—"selves" of both lecturer and student can be said to have been not only interchangeable, but ultimately reduced to the function of copying and storing information.

At least from Goffman's time onward, the authentic, spontaneous, and integrated self and its knowledge exemplified in the romantic era has been effectively shattered. It is reduced by Goffman to a number of selves, or perhaps more accurately, a number of discrete functions that are coordinated at the podium to produce only the illusion of a kind of unity, a kind of spontaneous creativity. Radio, television, and their recent permutations on the Internet all draw attention to "technological and formal aspects" of communication, as Walter Benjamin perceptively remarked. In these cases, what is important is clearly not ideas, spirit, or intellect, but rather "the voice, the diction, the language"—and for video, the face, the eyebrows, and other immediate visual elements. The concern is not "intelligences thinking in unison with the lecturer," but rather, the creation of an illusion of spontaneity, of speaking with "a total audience" as if communicating "with a single individual."

However, none of these configurations of the lecture—the medieval, romantic, or postmodern—are to be seen as entirely separate or mutually exclusive. In everyday lectures and presentations, they overlap and interleave. For example, I have given lecture versions of these chapters on the lecture a number of times—online and face-to-face, from Boise to Barcelona. In doing so, I have read Goffman and other sources verbatim, effectively reciting, transmitting, and preserving their words in the present. And I have done so while offering my own thoughts and suppositions. However, I have at the same time projected carefully edited and arranged images behind me while working from an edited digital document to create the illusion of the unity and simultaneity of thought, vision, and speech.

Conclusion

Educations and Generations

> What is an educational system, after all, if not a ritualization of the word; if not a qualification of some fixing of roles for speakers?
>
> —MICHEL FOUCAULT, 1971

You Are How You Learn

Michel Foucault, historian and lecturer extraordinaire, theorist of discourse and the formation of the self, did not write a great deal about education per se. He did briefly describe the school as a space for ordering "docile bodies" in his study of prisons and other disciplinary institutions, *Discipline & Punish*. He also had a great deal to say about the development of selfhood through myriad practices and devices—from sexuality to surveillance. However, education as such—as a system, as a set of values and functions, as specific discursive practices—is not treated in a conspicuous or sustained manner in his work. The quote that serves as the epigraph above provides a remarkable and valuable exception, recognizing education not only as a set of practices, but also highlighting the central mediatic distinction underlying those practices. Here it is in full: "What is an educational system, after all, if not a ritualization of the word; if not a qualification of some fixing of roles for speakers; if not the constitution of a (diffuse) doctrinal group; if not a distribution and an appropriation of discourse, with all its learning and its powers? What is 'writing' (that of 'writers') if not a similar form of subjection, perhaps taking rather different forms, but whose main stresses are nonetheless analogous?"[1]

In asking these questions, Foucault tentatively defines and orders a number of important terms. He characterizes the educational system as a set of rituals and

a collection of established procedures laden with traditional if not also spiritual connotations. Foucault also unexpectedly but clearly differentiates speaking and writing. He does not simply group those actions together as unimportant variations of "discourse," as he did in his analysis of the lecture (see chapter 9). Writing and speaking in this passage each play a different but analogous role in the "distribution" and "appropriation" of discourse occurring in an educational system. The "roles for speakers" are "fixed," according to Foucault. And both writing and writers, he says, have their own significance in discourse and its appropriation—appearing to also involve their own forms of "subjection," by which Foucault means raising and forming oneself as a subject. He is speaking of ongoing processes through which we negotiate for ourselves our own individuality, our recognized social role(s), and even our awareness of the world around us.

The notion of the self or subject and Foucault's understanding of its formation through processes of "subjection" underlie much of my analysis. The histories of the lecture and the textbook I have outlined are stories of changing forms and techniques of the formation of the changing subject. Or to put this more simply: who we are is an expression of how we have been taught. We *are* as a result of what we learn. The medieval and Reformation subjects, for example, are shaped and positioned through the careful dictation of the medieval lecture or through the Reformation catechism. The medieval self is formed as a conduit for precious and ancient truths, the Reformation self by virtue of a prescribed religious confession, by being positioned under the absolute selfhood of God. By way of contrast, the romantic notion of the self is formed quite differently. Pestalozzi regarded the self as the center in which our "five senses" and all our "ideas converge." And he saw this convergence as forming the basis for all subsequent teaching and learning. Fichte and Humboldt regarded the self as a kind of manifestation of creative spirit, capable of generating whole systems of knowledge by holding forth, spontaneously and authentically, at the lectern.

We might like to think that what the romantics said about teaching and learning is still valuable, at least to some extent, in our own contemporary postmodern world. Almost any academic would like Humboldt's idea of "a significant number of intelligences thinking in unison," inspired by his or her work in the archive, study, or lab. However, in reality, the romantics' ambitious visions for the self have been significantly downsized. The contemporary lecturer, I have emphasized, does not speak from any one authentic self or subject position. Instead, he or she can at best play a particular kind of role in front of a Webcam or in a video studio. This role is one that, together with other roles or selves, may

succeed in giving the illusion of a kind of spontaneous speech and thought. Similarly, in the case of the textbook, the self that is positioned through its questions, prompts, and problem-solutions is conceived as one that is at best able to monitor and regulate its own performance and feedback processes. As described in the language of cognitive psychology, it is no longer a self that is able to boldly create or recreate truths and insights for itself.

In the passage quoted above, however, Foucault refers to more than the "subjectification" that takes place through speaking and writing in the "system of education." He also speaks of how this same system fixes roles for speaking and other discursive practices. Similarly, I have emphasized how the oral and the inscriptive are carefully organized and imbricated on the most intricate level in the rituals of both the lecture hall and the study hall. In doing so (and in contradistinction to Foucault's concerns) I have paid close attention to media, writing, speaking, and newer recording and broadcast media. In the 1980s, Friedrich Kittler founded a new approach to media studies through his own combination of media history and Foucauldian theory. Simply put, Kittler extended Foucault's notion of discourse to include the media through which this discourse was generated and propagated. Kittler thus came to understand discourses as encompassing closely interconnected technical and material networks—which he labeled "inscriptive systems" or "discourse networks." These networks extend from national postal systems founded hundreds of years ago to today's fiber-optic infrastructure. Using the computational language of processing and storage to describe their most basic functions, Kittler explains: "The term *discourse network* . . . designate[s] the network of technologies and institutions that allow a given culture to select, store, and process relevant data. Technologies like that of book printing and the institutions coupled to it, such as literature and the university, thus constituted a historically very powerful formation."[2]

Kittler here identifies book printing, the university, and other long-established entities and institutions as powerful forces in history. I would add to these forms some of those I have discussed here, including the "formation" constituted by the book, the lecture, and the textbook. Naturally, these formations could also include other educational types and techniques, such as the curriculum and the (Socratic) dialogue, as well as seminar, text, and disputation.[3] Based on the examples I've explored, the evolution of these formations does not occur as a result of innovations in technology and media. Instead, the development of these formations is much more closely synchronized with larger religious, political, and cultural shifts. The textbook was reinvented in the sixteenth century with the

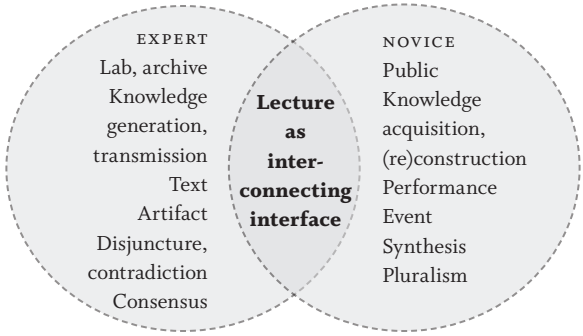
help of the printing press but more directly in response to forces of cultural, political, and religious reformation. The lecture, meanwhile, can be said to have been reinvented with the cultural force of romanticism and its discovery of the individual's power to freely create his or her own worlds of thought or feeling.

Today, even as technology has developed dramatically, the role of the individual appears to have devolved in a sense. As already discussed, the individual is no longer a "self-producing process." Any lecture this individual might give can no longer be regarded as a kind of collective "thinking in unison." While today's student, whether online or on campus, is not (one hopes) simply reducible to Nietzsche's writing hands and listening ears, today's studious self (or good student) is readily understood simply as a particularly effective node of control in a larger cognitive apparatus. This control, of course, is not exercised over a shared spirit or system of thought, but simply over the performance and efficiency of oneself. Alternatively (and perhaps more generally) this control might also be exercised over a small number of specialized functional selves—textual, authorial, and animator selves—whose roles are to be harmonized and optimized. We speak of the self or the subject in education today in ways that underscore that it is not as capable, coherent, and stable as it once was. We might see this as a loss or as something to be counteracted, but it is valuable simply to begin by recognizing that this change has occurred and that it likely has significant implications.[4]

Interfacing the Textbook and the Lecture

Throughout this book I have described the lecture and the textbook (and related genres) as a "form" or "forms." They represent the middle term connecting changing media with the broader continuities of education. These forms have served as flexible connecting devices through which the priorities and pressures coming from both media and education can be negotiated and reconciled. However, I believe that the textbook and the lecture can be seen as more than this. They can also be understood along the lines of Patrick Bazin's account of the book discussed in chapter 6. Based on this description of the "stable, reliable and public 'interface' of the book," it is possible to apply the diagram I developed from it (table 6.1) to portray the textbook and the lecture specifically as interfaces (see tables 10.1 and 10.2). In fact, in one recent book-length study on the genre of the academic lecture, Sybille Peters uses the term "interface" in precisely this way: "One can understand the lecture as a kind of interface between the audience and the sites of the production and storage of knowledge—such as the archive, database, collection or lab. It is an interface to sites of knowledge, [and] to which the listeners do not have access."[5]

Table 10.1 The lecture as interface



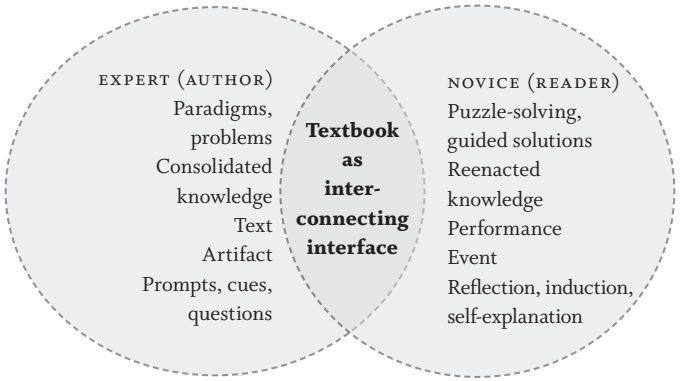
The lecture, like the book, can be seen as an elaborate means of interconnection that brings together opposed elements that might not otherwise be interrelated. The lecture brings the audience, whether students or sometimes the public, as Peters suggests, into multiple points of contact with highly specialized sites of knowledge and knowledge production. Like Bazin's "stable, reliable and public 'interface' of the book," the lecture thus is a kind of cultural paradigm, a complex meeting point at which author and reader, spirit and matter, universal and particular are brought into close contact. And they are interconnected in a manner both highly coordinated and conventionalized.

Referring in particular to the romantic and postmodern accounts of the lecture, this form offers an interface that, like the book, links two distinct roles and places or sites together. Instead of the author and reader, it is presenter and audience, expert and novice, teacher and student, who are interconnected through the lecture. In Humboldt's and also Peters's conception, this teacher is also a researcher, generating knowledge in the lab or archive, and synthesizing it for consumption by his or her audience. Also, instead of spirit and flesh, mind and matter, being conjoined, it is text and performance, artifact and event, that are brought together in the lecture. The speaker's PowerPoint slides and notes are "performed" or brought to life; they are realized as the "event" of the lecture. And in the course of this realization, knowledge is transmitted, reproduced, reconstituted, and reconstructed in a figurative epistemic circuit.

It is possible to take the metaphor of the form-as-interface even further, to apply it also to the textbook. In this case, many of the opposed elements brought together by this interface closely parallel those of the lecture. Above all, like the

interface of the book, the textbook interconnects author and reader. The one difference, however, is that the author is not sharing real experiences or a fictional world with the reader, but instead one or more areas of expertise, thus casting the reader (as in the case of the lecture) as a student or novice. The interconnection between spirit and matter in the book is also altered. The emphasis is not placed on a single author's thoughts, knowledge, or imaginings. Instead, as observed in chapter 7, textbooks are "unusual in their authorship." Textbooks frequently have multiple contributors or authors working more as collectors or editors than as lone creators. After all, according to Kuhn, the textbook is much more about the standard paradigms and problem-solutions of the discipline than any one author's individual point of view. The mental or spiritual element in the textbook thus does not exist primarily on the side of the author; its center of gravity is instead much closer to the reader or student. In responding to the textbook's inductive questions, study prompts, and varied illustrations and invitations, it is the student who is responsible to breathe life or spirit back into its otherwise lifeless letters. In the dorm room and study hall, the material artifact of the textbook, at least ideally, is transformed into a kind of studious event or performance of the student—his or her whispered reflection, recitation, self-explanation, and self-talk. Records of this event or performance may be found in the student's working through of paradigmatic problem-solutions in pages of notes and worked-out examples, and the highlights, tabs, dog-ears, and other markings on the pages of the textbook itself (table 10.2).

Table 10.2 The textbook as interface



To put this another way, the form of the textbook and the lecture work to cultivate an illusion. Erving Goffman has made this abundantly clear in the case of the lecture. For the textbook, its rhetoric, its layout, and other (often visual) techniques that simulate and stimulate self-talk and self-explanation have a similar effect. Instead of appearing as a task of indoctrination into dogma that the student "is neither invited nor equipped to evaluate," the textbook provides for the student the illusion that such an experience is much more akin to an exercise in freedom, growth, and individual enrichment.

The Epistemology of the Textbook and the Lecture

As interfaces connecting expert and novice, artifact and event, mental and material, the textbook and the lecture, like the book itself, are connected closely with broader conceptions of knowledge or epistemologies. As I showed in chapter 6, the humble form of the book can be seen as embodying knowledge and ideas or, as Milton put it, a certain "potency of life." Viewed simultaneously as containing living ideas (if not life itself) and as an inert object, the book formed a crucial test case for the empiricists and shaped how they understood both knowledge (like letters on paper) and the mind (a white page waiting to receive letters and ideas). The textbook and the lecture provide similar places where knowledge is embodied, enacted, and disseminated.

I have discussed how Fichte and his romantic contemporaries saw the lecture as a model for the spontaneous generation and communication of knowledge. This epistemology of the lecture is entirely consistent with romantic conceptions of knowledge. Referring to this knowledge as "spirit," the romantics believed it arose in and through one's own spontaneous, expressive words or even cries. As a second example, a very different epistemology governed the textbook and the lecture in the Middle Ages, one that sees knowledge as grounded entirely in the authority of texts and fragments coming from the ancient past. The idea that an individual's experience or insights could add to this authoritative knowledge base had little or no meaning. These ancient texts served at once as scripts for lecturers and, through dictation and copying, as textbooks for students. Knowledge of this kind could at best be rendered and preserved verbatim; it was impressed on the mind of the students with the same urgency and conviction as it was repeatedly inscribed with ink on paper.

Like the book, the lecture and the textbook can be said to represent a kind of interface within a larger epistemic circuit, a type of figurative conjunction point in which knowledge is reconfigured and reconstituted—specifically for the purpose

of being relayed, reproduced, and (sometimes) reconfigured further. However, a different kind of knowledge or epistemology comes to the fore when these forms and their practices are viewed over the *longue durée*. This knowledge is one that can be described as specifically instructional, pedagogical, or even didactic. It is one that has been identified and formalized in different traditions and contexts, at least in Europe, since the 1500s. It includes the internationally influential J. H. Pestalozzi and J. A. Comenius, with Comenius's 1638 magnum opus being the *Didactica Magna*, or the *Great Didactic*, one of the earliest explicit articulations of this epistemology.

This didactic approach to knowledge is a way of viewing and working with it that seeks to recast knowledge in entirely pedagogical terms, such as teaching, instruction, and learning, rather than its experimental or empirical validation. This epistemology has also appeared at various points, and in various guises, throughout this book. The most prominent example is from chapter 2, where I noted a kind of "pedagogical systematization" evident in ancient Sumerian scribal instruction. I focused on the example of the Nippur Curriculum, a complex but widely used elementary instructional sequence from the second millennium BCE, and I showed how it represents a kind of dissection and radical reordering of aspects of expert scribal practice. The job of a scribe—writing up contracts, composing messages, copying complex texts—is decomposed in this curriculum into discrete and finely differentiated skills, exercises, and activities, which are then systematized into a set of steps. Each stage builds carefully on the ones established previously, and various sets of steps are grouped into broader phases. I pointed out that a number of these exercises could only have been purpose-built for learning and instruction—and that on their own they appear at best as arbitrary and arduous tasks undertaken, for some reason, at "that mysterious thing called a school."

One specific example I highlighted was the problem-question in geometry and mathematics. Like math word problems today (e.g., calculating the area of an L-shaped room), texts or tablets from ancient Sumer provided problems for scribal novices, and similar examples reappear centuries later in Euclid's *Elements* and the *Zhou Bi Suan Jing*—such as the famous economical solution to the Pythagorean theorem from the latter. And of course, contemporary instances of such problem-questions abound in textbooks and worksheets used in schools today. A second example of a presentation of knowledge that appears to have been purpose-built for education is demonstrated in Comenius's *Orbis Pictus*. The single sample page from this text shown in chapter 3 (figure 3.1) represents a

complex collocation of a range of what today are recognized as research-based principles for multimedia learning. As outlined by cognitive scientist Richard Mayer, these include the principles of spatial contiguity, coherence, and segmenting, and also the "multimedia principle," which affirms the instructional effectiveness of the combination of images and text. The continuity of these techniques over centuries of print, and now in our age of multimedia technology, suggests that they embody yet another specifically didactical way of presenting knowledge. Indeed, one might say that these techniques of presentation are ways of "didacticizing" knowledge, and that exemplary educational forms and examples today bring together multiple techniques of this kind into close coordination.

A contemporary version of the transformation of knowledge into didactical form is provided by Thomas Kuhn and his account of the textbook and paradigm shift, discussed in chapter 7. On the one hand, Kuhn describes "normal science" as "productive of consequential novelties"—a place where paradigm shifts can and do occur. On the other hand, he sees scientific education as more of "a relatively dogmatic initiation into a pre-established problem solving tradition"—as a context where paradigms are merely reinforced. Others have seen Kuhn's distinction as doing nothing less than outlining two very different kinds of knowledge. The first is scientific (or more broadly, academic) knowledge, which is developed through questioning, research, and debate. This kind of knowledge can result from experiments in a lab, through research in an archive, or via the systematic deployment of a wide range of formalized empirical research methods. For paradigm shifts to occur, this knowledge must be regarded as provisional in some way, open to rethinking and revision. Pedagogical or didactic knowledge, on the other hand, is not simply dogmatic, but is made easy, even tempting to consume, digest, and absorb: "As a rule it is obvious, unambiguous, precise, ordered and interesting, and it is not supposed to take a lot of time to learn," as one scholar has observed.[6] It can be described as dogmatic insofar as "it is primarily viewed as an object of *teaching*."[7] The characteristics of this knowledge are precisely the characteristics of any good textbook or lecture as they have been described here: they avoid unnecessary ambiguity while being clear, easy-to-follow, well-structured, and engaging for the reader or the listener.

The conclusions of my studies of the textbook and the lecture not only emphasized these characteristics for each form; they also showed how recommendations for each form today represent a kind of collocation or combination of instructional approaches from the past. The lecture, for example, is still seen very

much in terms of the authenticity of the self-creating romantic self. However, as recommendations for TED Talks and other contemporary lecture scenarios make clear, the role of the speaker as actor has been added, perhaps paradoxically, to romantic expectations of authentic delivery and creativity. Learning principles already evident in Comenius's work (for example, combinations of segmented and continuous visual and textual content) are carefully combined with examples of Pestalozzi's inductive questioning, as well as coordinated elements of graphical and textual design. As one historian of education has pointed out, through these and related didactical techniques knowledge is in a sense made clearly and openly "visible, which is to say: it is combined, arranged and structured for the purpose of effective teaching."[8]

Comenius obviously knew this in composing his *Orbis Pictus* in the 1600s, and we can readily recognize it today in instructional materials and performances that we ourselves regard or recall as effective or engaging. However, the idea of a type of knowledge that works in ways that are specifically instructional is largely unknown in educational thought today. For starters, it is deeply incompatible with today's constructivist and cognitive epistemologies or theories of learning: How can there be specifically didactic forms of epistemology, knowledge, or even content when knowledge itself only consists of so much information or data, as both empiricists and cognitivists insist? What is the value of combining, arranging, and structuring this information to render it pedagogical if such data must always be structured and constructed anew—as constructivist reformers contend?

The lessons of the centuries-long evolution and success of the textbook and the lecture thus raise serious questions about familiar theories of knowledge or learning that are crucial in education today—theories that are also dismissive of the traditional textbook and lecture forms. For the lecture and the textbook, as well as other commonplace pedagogical forms, do not simply transmit or reproduce knowledge; they transform it. And the nature of this transformation is one that is most readily available and recognizable in the culture and history that surrounds us—rather than in the latest neuroscience that can study only their physical effects. The transformative power of forms like the lecture and the textbook has been amassed over centuries of cultural effort and development, adjusted and fine-tuned to connect the changing circumstances of education and its (new) media. Through this transformation, knowledge is transmitted, reproduced, reconstituted, and reconstructed by each new generation

in an enterprise that, regardless of its vast history, always remains challenging and contested.

Change and the *Longue Durée*

I began this book by asking: "Why are schools and higher education apparently so little changed in our era of digital media?" By examining the slowly changing significance of educational forms and media practices, I hope I've not only addressed this question, but at the same time undermined it. Digital and other media technologies have clearly *not* left education unchanged. Instead, any apparent lack of change is simply an illusion. The illusion of the unchanging nature of the educational institution—with its classrooms, lecture halls, blackboards, and textbooks—begins to fade when the timescale is expanded to the *longue durée*. This illusion of the static nature of educational practice is further dispelled when the focus is shifted from the narrow questions of technical function to the meanings of the broader cultural context. We can recognize, for example, that the textbook and the lecture have not always been simple means of information transmission. Instead, they have also served as means of information preservation (chapter 8) and religious interpellation (chapter 7). Later, these forms came to represent more of a dramatic performance (chapter 9), or even a tool for "paradigm stabilization" (chapter 7). It is clear that change is actually the rule rather than the exception when it comes to media in education. However, it is also clear that this change may be imperceptibly slow when viewed on the scale of months, years, or even decades.

This leads to another key question: Why are these changes so slow? Why have new technologies like computers and the Internet upended or even eliminated whole industries (e.g., music, video rentals, newspapers), leaving education all but unchanged? In this book, I have shown how the history and the possible changes and continuities in education are also the history, changes, and continuities of writing. And writing, as I have shown, is incredibly obstinate. The characters of our alphabet have remained largely the same since the Etruscans, for over 2,000 years. And these characters, in turn, go back many more centuries to a single script—Proto-Sinaitic—which is the likely basis or inspiration for all writing systems used around the globe today, with the exception of scripts derived from ancient Chinese. The ways in which we learn these characters and practice their inscription—whether we are using a reed, a quill, or a pencil—have also been remarkably stable. Even though we now use

keyboards and screens for a great deal of writing (and learning) today, the layout of the alphabet on our "new" QWERTY keyboard technologies has been set since 1878.

The physical and procedural nature of writing, and the mutual relation of the human body to writing instruments, technologies, and materials, all play an important role in this connection. As I have shown in this book, from ancient Sumer to Imperial China, and from Roman Judea to romantic Germany, remarkably similar physical arrangements and temporal sequences for instruction and practice appear and reappear with regularity. One of these patterned physical arrangements, I have shown, is the process of reading and writing as it is embodied in the stylus, pen, or finger, and the receptive surface of the writing tablet. This simple technology or technical arrangement allows the writer or reader to hold the inscriptive (or inscribed) surface in one hand at a comfortable distance from the eyes, with the other used for writing and pointing—and more recently, scrolling, zooming, and clicking. In educational or instructional contexts, the arrangements vary in particular ways: the inscriptive surface as well as the inscribing device may be larger or smaller, according to the given instructional requirements. Considering the consistent evidence for the use of the tablet in writing instruction over time, we might wonder only at its brief disappearance during the twentieth century, when inexpensive paper and later keyboards and computers rendered it temporarily absent, at least in Western schools.

A second recognizably patterned arrangement is the combination of the two most fundamental media—speaking and writing—in instructional forms and practice. In this book I have written of the likelihood of recitation exercises in writing in ancient Sumer and of the domination of textually scripted recitation starting with the Reformation in the West and lasting for centuries after. Later these oral forms became less explicitly scripted and less overtly external. They gradually came to take the form of carefully cued and practiced fresh talk in the lecture and internalized self-talk and self-explanation in the textbook. Thus these explicit oral forms were suppressed, only to reappear in a form that is more implicit but no less important to the textbook and its pedagogy. However, regardless of how these processes might have been conceptualized or theorized over the centuries—whether in terms of "the absolute privilege of writing" or the oral "cries of nature"—both the spoken and the written have remained irreducible to one another in practice. There is no "great divide" between orality and literacy in education. Instead oral modes are used to support, augment, perform, or enliven what is given textually. The written word is both propagated and brought

to life through the well-prepared lecture or the most elementary catechism. Barton's observations from chapter 6, that "literacy practices are totally bound up with oral language," and that much "of schooling can be characterized as *talk around texts*,"[9] are likely as true today as they were in instructional contexts hundreds, even thousands, of years ago.

Instruction in reading, writing, and other symbolic competencies, I have shown, demonstrates continuities not only over centuries but over millennia. Writing has been a central part of human society for perhaps 4,500 years. As I emphasized in the preface, this handful of millennia is decidedly not an evolutionary timescale, but fits the scale of historical and cultural time. These few millennia do not tell a story of evolutionary changes in human physiology or neurology. Instead, they tell the story of the ways human culture and practice have been able to stretch and reshape the limits of this physiology and neurology. Neuroscience shows that learning to read and write involves a significant rewiring of given, otherwise stable, and also obstinate human neural networks.

As I have also argued, no neuroscientist is able to reach into the brain—either literally or figuratively—to accomplish this rewiring directly. Instead, it happens only on the outside, in the varied and uncertain world of human practice and human history. This painstaking reproduction of inscriptive and textual abilities must be repeated for each child, and also for each new generation—every 30 years. Mental and physical human abilities, such as learning to speak a language, rest on a layer of biological bedrock. This biological capability was put in place many tens if not hundreds of thousands of years ago. However, the culture and material forms that are central to the achievements of writing and text have been around only for some 4,500 years, a historical rather than an evolutionary timescale. Over this historical and cultural timeframe this achievement has been accomplished in remarkably similar ways and in varying historical contexts, including the Sumerian *edubba'a*, Jewish Torah schools, and the catechetical schools of the Reformation. In being adapted and re-achieved with each new generation, the accomplishment of writing forms only the thinnest and most fragile of layers over our animal genetic inheritance. Its fragility is surely one of the reasons for the urgency and the embattled nature of education. At the same time, the fact that this accomplishment must be re-achieved so frequently and unfailingly means that it is also particularly impervious to wholesale change.

The math involved is simple: over 4,500 years, there have been only 150 spans of 30 years—150 generational cohorts, strictly speaking. In this sense there have been only 150 combinations of cultural, technological, mental, and physical

possibilities for achieving the reproduction of writing as a cultural achievement and the knowledge requisite to continue its reproduction and revision. Of course this includes not only the transmission of textual and inscriptive techniques, but also the meanings of the culture that have accumulated up to that time (naturally, much is also lost in this process). Moreover, whether in the role of educators or students, we always stand in this process as links in a chain, responsible in one way or another for its continuation. The room for error, variation, and experimentation is not great.

These simple observations should make it much less surprising that the forms and techniques that have secured this continuation have remained remarkably consistent over time. To cultivate what is required for the development and maintenance of this work involves considerable instructional effort and coordination. Moreover, this effort must be consistent across both space (throughout a nation or region) and time (spanning multiple generations). We can certainly work to make some moments in this process more profitable or meaningful than others, but we cannot step outside of our role to assess or redesign this process as if we were standing entirely outside of it. As history shows, significant changes have arisen, but they have been relatively few and far between, accumulating only gradually. And they tell us much more about our culture and our human limitations than they do about the inevitability of scientific and technological improvement.

Notes

PREFACE: **Education as Technological from the Start**

1. Wolf. *Proust,* 19. Repeating a centuries-old ethnocentrism, Wolf regards the alphabet as an "almost perfect" writing system that allows "every spoken word in every language to be translated into writing" (p. 19). This is false and deeply problematic. Even the International Phonetic Alphabet—which combines Latin with Arabic and other characters, and includes 184 (pulmonic) consonants and 33 diacritics—does not cover the variety of sounds in the human language. In this book, I regard the alphabet as neither encompassing all languages nor as otherwise superior to other writing systems and technologies. I believe instead that the alphabet is so foundational in the West that it sets the terms by which the most basic functions of writing are understood, thus making meaningful cross-cultural comparison impossible.
2. Ibid., 108.

CHAPTER ONE: **No More Pencils, No More Books?**

1. Illich, *Deschooling Society*, 44.
2. McLuhan, "Classroom without Walls," 1.
3. Rousseau, *Emile,* 184.
4. Dewey, "Dewey Assails Major Parties," 2; Dewey, "Primary Education," 317.
5. Dewey, "Primary Education," 317.
6. Dewey, "My Pedagogic Creed," 229.
7. Dewey, "Primary Education," 317.
8. "Step Two: A Promise of Hope," AA Twelve Steps pamphlet (Center City MN: Hazelden Foundation, 1980), 10; see https://en.wikiquote.org/wiki/Narcotics_Anonymous/.
9. Pappano, "Year of the MOOC."
10. Ignite has as its motto, "Enlighten us, but make it quick" (http://igniteshow.com); see also https://www.khanacademy.org.
11. Dewey, *Democracy and Education*, 328.
12. Braudel, "On History," 33.
13. Ibid., 28.
14. Proust, "Master's Writings," 162.
15. Schiffler and Winkler, *Tausend Jahre Schule.*
16. Thorburn and Jenkins, "Toward an Aesthetics," 12.
17. Braudel, "On History," 33.
18. Ibid.

19. This also means that media are not seen here primarily in terms of the facilitation (and possible distortion) of civic and political communication and debate. I do not regard media as ideally serving the public interest by functioning transparently, allowing for the transmission of political facts (or falsehoods). Instead, the focus here is on what one theorist has described as "those insignificant, unprepossessing technologies that underlie the constitution of meaning and tend to escape our usual methods of understanding." Siegert, "Introduction," 3.
20. E.g., see Bolter and Grusin, *Remediation*.
21. McLuhan, *Understanding Media,* 8.
22. Ibid.
23. Derrida, *Of Grammatology,* 9.

CHAPTER TWO: **Writing Instruction in the Twenty-First Century**

Epigraph: Hoskin, "Technologies," 27.

1. Gnanadesikan, *Writing Revolution*, 2.
2. Pinker, *Why Our Children*, ix.
3. One expert explains, "We don't know how old the students were at the beginning of their scribal education. They were old enough to be able to manipulate clay and *calame* (the cane the scribes used to impress signs on wet clay), but still in the charge of their parents. Moreover, the age of the students could have changed according to the place and the period." Proust, "Master's Writings," 8.
4. Proust, "Master's Writings," 162.
5. Terms such as "school," "student," "teacher," "curriculum," and even "literacy" are widely used by Assyriologists, anthropologists, and archaeologists in describing instructional practices in Sumer and elsewhere. However, many historians and theorists see this use of a modern educational vocabulary to label artifacts and practices from alien cultures as a problem. It is the projection of what we take for granted today (e.g., generally secular, universal, publicly supported education) onto cultural practices and situations that almost certainly were quite different (e.g., private, elite, religious). Therefore, I use more neutral and less overtly loaded categories wherever possible (e.g., instruction, inscription, scribe, and scribal) and take care to point out only specific similarities (and differences) in material evidence regarding instruction and related practices.
6. Hilprecht, *Excavations*, 524–525.
7. Tinney, "Scribal Education," 49.
8. Proust, "Master's Writings," 563.
9. Robson, "Scholarly Knowledge," 563.
10. Tinney, "Scribal Education," 48.
11. Neugebauer and Sachs, *Mathematical Cuneiform Texts*, 38.
12. Asher, *Handwriting Instruction*, 466.
13. Burns, *Improving Handwriting,* 21.
14. Barton, *Literacy*, 178.
15. Drazin, *Jewish Education,* 110.
16. Morris, *Jewish School*, 55.

17. Ibid., 53. Girls were also taught to read the Torah, but boys were the principal focus of educational efforts at this time.
18. Ibid., 58.
19. Höllmann, *Chinesische Schrift,* 23.
20. Weiping, "Chinese Language Pedagogy," 141.
21. Paar, *Ch'ien tzu wen*, 3.

CHAPTER THREE: **Psychology and the Rationalist "Transcript of the Mind"**

Epigraph: Vygotsky, *Problems,* 166.

1. This could not be clearer in the case of educational research. The ERIC collection (http://eric.ed.gov/) indexes almost 1,000 educational journals and their articles and categorizes over 6,600 articles under the term "constructivism." This exceeds the number of articles for other "learning theories" it lists by a factor of three or more.
2. Joshua 1:8 (New International Version).
3. Plato, "Phaedrus," 402.
4. *New International Encyclopædia*, s.v. "Comenius, Johann Amos."
5. Komenský, *Umgang mit Büchern,* 223.
6. Durant and Durant, *Rousseau and Revolution,* 3.
7. Tröhler, *Pestalozzi and Educationalizatio*n, 79, 80, 103.
8. Foucault, *Order of Things*, 42.
9. Ibid., 47.
10. Galileo, as quoted in Blumenberg, *Metaphorology*, 70.
11. Ibid.
12. Ibid.
13. Comenius, *Way of Light*, 4.
14. Ibid.
15. Ibid., 183.
16. Ibid., 4.
17. Ibid., 148.
18. Eisenstein, *Printing Press,* 52.
19. Comenius, *Visible World*, A4.
20. Golumbia, *Computation*, 31.
21. Ibid., 57.

CHAPTER FOUR: **The Romantic Tradition**

1. Rousseau, *Essay,* 294.
2. Rousseau, *Second Discourse,* 146.
3. Ibid., 300 (emphases added).
4. Ibid.
5. Rousseau, *Emile,* 116.
6. Ibid., 117.
7. Ibid., 73.
8. Derrida, *Of Grammatology*, 141–142.
9. Pestalozzi, *Gertrude*, 130.

10. Ibid., 206.
11. Stephani, *Fibel*, 33.
12. *Alphabetizierung*, the word for "literacy" in this passage, was originally translated as "alphabetization."
13. Kittler, *Discourse Networks*, 53.
14. Dewey and Dewey, *Schools of To-Morrow,* 22.
15. Dewey, "Psychology and Social Practice," 115.

CHAPTER FIVE: **Romantic versus Rationalist Reform**

1. Foucault, *Order of Things*, 42.
2. Comenius, *Way of Light*, 148.
3. Comenius. *Visible World*, A4.
4. Papert, *Mindstorms*, 8–9.
5. Ibid., 5–6.
6. Ibid., 6.
7. Schank, *Teaching,* 15.
8. Ibid., 19.
9. Ibid., 15.
10. Prensky, *Digital Natives,* 1.
11. See, for example: Bullen and Morgan, "Digital Learners," 60–68; Teo, "Do digital natives differ?" 1725–1739; Ahn and Jung, "Dependence on Smartphone," 1236–1256.
12. Prensky, *Digital Natives*, 1.
13. Comenius, *Way of Light*, 183 (emphasis added).
14. Chomsky, "A Review," 57.
15. Descartes, as quoted in Blumenberg, *Metaphorology*, 70.
16. Chomsky, *Syntactic Structures,* 13, 21.
17. Clark and Mayer, *E-Learning*, 30.
18. Ibid., 67.
19. Comenius. *Visible World*, A4.
20. Ibid., 45.
21. Various approaches mix elements from these two traditions in interesting and creative ways to produce even further variations on the patterns mentioned above; e.g., see Friesen, "Media, Pedagogy," 233–251.

CHAPTER SIX: **Theorizing Media—by the Book**

Epigraph: McLuhan, *Letters,* 429. The full quote from McLuhan is rather more complex, but no less revealing. Corresponding with his friend Claude Bissell about the late Canadian media theorist Harold Innis, McLuhan wrote: "For 2500 years the philosophers of the Western world have excluded all technology from the matter-form in entelechy treatment. Innis spent much of his life trying to explain how Greek culture had been destroyed by writing and its effects on their oral tradition. Innis also spent much of his life trying to draw attention to the psychic and social consequences of technologies. It did not occur to him that our philosophy systematically excludes techne [sic] from its meditations. Only natural and living forms are classified as hylo-morphic."

1. Wolfe, *Pump House Gang,* 109.
2. Guillory, "Media Concept," 323.
3. Kittler, *Film, Gramophone, Typewriter*, 5.
4. Foucault, "Folie, littérature, société."
5. Nietzsche, *Twilight of the Idols,* 6.
6. Nietzsche wrote: "*UNSER SCHREIBZEUG ARBEITET MIT AN UNSEREN GEDANKEN,*" which, literally and ungrammatically, can be rendered as "Our writing device works *with* on our thoughts." (It has also translated as "Our writing tools are also working on our thoughts"). See Kittler, *Film, Gramophone, Typewriter*, 200.
7. Milton, *Areopagitica,* 4.
8. Daniel Defoe provides a (perhaps fictional) account of a fifteenth-century encounter of the "famous doctors of the faculty at Paris" with printed Bibles: "They observed the exact agreement of every book, one with another, that every line stood in the same place, every page a like number of lines, every line a like number of words; if a word was mis-spelt in one, it was mis-spelt also in all, nay, that if there was a blot in one, it was alike in all; they began again to muse, how this should be; in a word, the learned divines not being able to comprehend the thing, (and that was always sufficient,) concluded it must be the Devil, that it was done by magic and witchcraft." Defoe, *Political History,* 325.
9. Krämer, "Messenger as Model," 205.
10. Ibid.
11. McLuhan, "Playboy Interview," 53–74.
12. The use of this title in connection with the work of media theorist Neil Postman is not my own invention, but appeared in a 1987 critical review of some of his earlier books: Hoikkala, Rahkonen, Tigerstedt, and Jussi, *Mr. Postman*, 87–99.
13. Postman, "Preface," xiii.
14. Postman, *Amusing Ourselves to Death,* 87.
15. McLuhan, "Playboy Interview," 72.
16. Postman, *Amusing Ourselves to Death*, 8, 156.
17. Postman, *Technopoly,* 17; Postman, *Amusing Ourselves*, 51.
18. McLuhan, *Gutenberg Galaxy.*
19. Postman, " Cyberspace."
20. Kay and Goldberg, "Personal Dynamic Media," 32; Frank Hartmann considers this same idea from the perspective of philosophy in Hartmann, *Medienphilosophie.*
21. McLuhan, *Understanding Media,* 50, 78.
22. Postman, *Technopoly*, 17.
23. E.g., Chandler, *Biases of the Ear and Eye*; Coleman, *Public Reading.*
24. Stock, *Implications of Literacy,* 4, 9. Postman does admit in his 1992 book, *Technopoly,* that the great divide between orality and print is not much in evidence in education. He speaks of the prevalence of a "pedagogical peace between these two forms of learning" in the classroom, and fears that it will be ended by the arrival of the computer (Postman, *Technopoly*, 17).
25. Barton, *Literacy,* 179.
26. E.g., see: Knorr Cetina, "Objectual Practice," 175–188.

27. Kittler, *Baggersee,* 38 (emphasis added).

28. Locke, *Essay,* 41. For an in-depth discussion of Locke's metaphor, its "pre-history" and reception, see Pasanek, *Metaphors of Mind,* 227–248.

29. Of course, now we have computers and screens that form a third class of objects. Like the mind (and the written page), computers and digital technologies also contain and communicate "ideas," broadly speaking. Naturally, in addition to these two functions, digital technologies also process what they store and transmit, likely making them even more powerful as epistemic metaphors in contemporary thinking and writing. (See Friesen, "Mind and Machine," 83–92. In this article, I discuss the idea of computers as epistemologically powerful technologies, "epistemological engines," and the challenges this presents for research in education and [computer] technology.)

30. Locke, *Essay,* 86.

31. Berkeley, *Three Dialogues,* 183.

32. James is actually quoting, in the form of a philosophical dialogue, a German colleague, Münsterberg. See James, "Does 'Consciousness' Exist?" 11.

33. Bazin, "Toward Metareading," 159.

34. Ibid.

35. This approach to the book and the logic or epistemology of Western modernity was inspired by Blumenberg, *Lesbarkeit der Welt*.

CHAPTER SEVEN: **A Textbook Case**

Epigraph: Kuhn, *Structure*, 1.

1. Kuhn, *Revolutions*, 143.
2. Ibid., v.
3. Kuhn, "What Are Scientific Revolutions?" 16.
4. Kuhn, "Dogma," 347–369.
5. Ibid., 349.
6. Ibid. (emphasis added).
7. Ibid., 351.
8. Kuhn, *Revolutions*, 43.
9. McLuhan, *Understanding Media*, 173.
10. The part of a sundial that casts a shadow.
11. Cullen, *Astronomy.*
12. See Tufte, *Envisioning Information*, 82.
13. Heath, *Euclid's Elements*, 153, 281.
14. Boyer and Merzbach, *A History of Mathematics*, 90, 92, 109.
15. Carr, Carr, and Schultz, *Archives of Instruction,* 11.
16. Chambliss and Calfee, *Textbooks for Learning*, 17.
17. Hamilton, *Schooling*, 16.
18. Ibid., 16.
19. Strauss, *Luther's House,* 175.
20. Houston, *Literacy,* 63.
21. Ibid., 64.
22. Luther, *Catechism.*

23. Grimm and Grimm, *Deutsches Wörterbuch*.
24. Strauss, *Luther's House*, 172.
25. Althusser, "Ideology," 48.
26. Ibid., 52.
27. Ibid.
28. Bosse," 'Die Schuler müßen selbst,' " 67–111.
29. Chartier, "Literacy Skills," 455.
30. Wakefield, "Textbooks," 5.
31. Ibid., 2–3.
32. Herder, "Schulrede 1800," 732.
33. Pestalozzi, *How Gertrude*, 101.
34. Ibid., 86.
35. Ibid., 71.
36. Colburn, *First Lessons*, 1.
37. Ibid., 13.
38. Perkinson, "American Textbooks," xii.
39. Ibid.
40. The quote is: "I have made a ceaseless effort not to ridicule, not to bewail, not to scorn human actions, but to understand them." The text to the left of this quote, meanwhile, asks its readers to "consider some of psychology's questions that from time to time you may wonder about."
41. Chi, Bassok, Lewis, Reimann, and Glaser, "Self-Explanations,"145–182.
42. VanLehn, Jones, and Chi, "Self-Explanation Effect," 1–59.
43. Kuhn, "Dogma," 351.
44. Ibid., 351.

CHAPTER EIGHT: From *Translatio Studiorum* to "Intelligences Thinking in Unison"

Epigraph: Nietzsche, *Anti-Education,* 75–76.

1. This last claim, as well as many clichés regarding the hopelessly antiquated nature of the lecture form, can be found in this article from *Science*: Bajak, "Lectures."
2. King, "Sage," 30–35.
3. Lyotard, *Postmodern Condition,* 50.
4. Laurillard, *Rethinking,* 91, 93.
5. Ibid., 94.
6. Ibid., 93.
7. Guo, Kim, and Rubin, "Video Production," 41.
8. Leschke, *Vernetzte Präsenz,* 11.
9. E.g., Brent, "Teaching as Performance"; Jones, "Reflections on the lecture," 397–406.
10. Grafton, *New Worlds,* 1.
11. Harbison, *Christian Scholar,* 5.
12. Eisenstein, *Printing Press*, 114.
13. Karlsohn, "On Humboldtian," 47.

14. Briggs and Burke, *Social History,* 54.

15. Saenger, *Space Between Words,* 264–265. Saenger shows how word separation and, correlatively, silent reading spread very gradually through Europe during the final centuries of the Middle Ages. Despite this development, he argues that medieval lectures were not sites of careful dictation and verbatim note taking: "The oft-reported thesis that scholastic books were normally written by students transcribing professorial dictation during professional lectures is unsubstantiated by contemporary descriptions of the medieval classroom or by paleographical [or handwritten] evidence." Although more recent work has confirmed this same thesis, I note that it has been the subject of some controversy.

16. Eisenstein, *Printing Press*, 524.
17. Kittler, "Universities," 245.
18. Thorndike, *University Records and Life,* 53–54.
19. Hajnal, as quoted in McLuhan, *Gutenberg Galaxy*, 95.
20. Clark, *Academic Charisma,* 87.
21. Münster, *Cosmographia*, ccccxiii.
22. Eisenstein. *Printing Press*, 66.
23. Lindberg, "Academic Lecture," 39.
24. Ibid., 41.
25. Boudinhon, "Glosses, Glossaries, Glossarists."
26. Verger, "Lecture," 836.
27. Clark, *Academic Charisma,* 83.
28. Ibid., 410.
29. Ehrlich, *Fichte als Redner*, 37–39.
30. Fichte, "Deducierter Plan," 97–98.
31. Moran, *Printing Presses,* 103.
32. Bowman, "Fichte."
33. Fichte, "Spirit and Letter," 201 (emphasis added).
34. Kittler, *Philosophien der Literatur,* 146.
35. Fichte, "Spirit and Letter," 196.
36. Ibid., 212.
37. Ibid., 198–199.
38. E.g., see Deem, Hillyard, and Reed, *Knowledge,* 80.
39. von Humboldt, "Spirit," 247.
40. Karlsohn, "Academic Lecture," 49.
41. Nietzsche, *Anti-Education*, 36–37.

CHAPTER NINE: **The Lecture as Postmodern Performance**

Epigraph: Foucault, *On the Punitive Society*, xiii.

1. For details on Russell's Reith Lectures and their critics see Ince, *Bertrand Russell*. Russell himself wrote of the potential of radio for both democratic education and deceptive rhetoric (or "eloquence") in 1938: "If I had control of education, I should expose children to the most vehement and eloquent advocates on all sides of every topical question, who should speak to the schools from the BBC. The teacher should afterwards in-

vite the children to summarize the arguments used, and should gently insinuate the view that eloquence is inversely proportional to solid reason. To acquire immunity to eloquence is of the utmost importance to the citizens of a democracy." Russell, *Basic Writings*, 660.

2. For example, referencing audio tapes of Foucault's later lectures at the Collège de France, the editors of *Biopolitics* note: "We have made use of the recordings made by Gilbert Burlet and Jacques Lagrange in particular [. . .] Suspension points [in the text] indicate that the recording is inaudible." Foucault, *Birth of Biopolitics*, xv, xvii.

3. Gérard Petitjean, as quoted in Foucault, *On the Punitive Society*, xiii.

4. Ibid.

5. E.g., see Franzel, *Connected by the Ear*, 17. The beginnings of "academic celebrity" can be traced as far back as the romantic era, according to Franzel. However, as I go on to argue here, Foucault's celebrity is manifest in certain media phenomena that are much more contemporary.

6. Peters, *Der Vortrag*, 111–134.

7. Foucault opens his inaugural lecture at the Collège by saying that in holding forth, he is "entering into [a] . . . risky order of discourse," and also operating as the source "from whom discourse proceed[s]." Foucault, "Discourse," 51.

8. Bourdieu opens his lecture—also at the Collège de France—by describing it as an "enactment of the process of delegation whereby the new master is finally authorized to speak with authority, and which establishes his words as a legitimate discourse." Bourdieu then focuses on the numerous frames of reference (e.g., discursive, political, and institutional) invoked in this statement, omitting the genre or frame of reference provided by the lecture as such throughout his analyses. See Bourdieu, "Lecture," 177–198.

9. Derrida opens his lecture by lamenting that the university has entered "a new . . . destabilizing . . . technical 'stage' of virtualization (computerization, digitalization . . . and so forth)." Despite this acknowledgment of the importance of (new) technologies for the university, Derrida explains that such matters must be "put aside." He goes on to make a case for the "right" to exercise his trademark method of "deconstruction" in the academy. And one of the underpinning assumptions of this method is that all expression is subject to *différance*, the "supplement," and the "trace"—to the destabilizing conditions exemplified in written language and its analyses. See Derrida, "University without Condition," 210.

10. Benjamin, "Reflections on Radio," 363.

11. Carpenter, "Certain Media Biases," 65–74.

12. "Video Best Teacher, Researchers Find," *New York Times*, March 5, 1954.

13. Lawler, "Lecturing by Television," 174.

14. Geminus, "It seems to me," 1290.

15. Klass, "Plato."

16. Agarwal, "Rock-Star Professor."

17. Goffman, *Presentation of Self*, 252.

18. Ibid., 253.

19. Goffman, "The Lecture," 173.

20. Ibid., 171.

21. Admittedly, this would likely strain the abilities of most actors.
22. Goffman, "The Lecture," 171 (emphasis added).
23. Ibid., 172.
24. Ibid., 171 (only last emphasis added).
25. Ibid., 190.
26. In academia today, the split Goffman identifies between the textual self and the self-as-animator can be seen as being radicalized in the form of contingent academic labor, which has increased dramatically in proportion to tenured or tenure-track faculty positions. This pool of contingent labor is often populated by advanced students or recent graduates, who are hired on temporary contracts and only for the purposes of instruction. These contract instructors typically have no professional research function. Of course, these students are not actors, but they generally do possess some form of "textual" credential and experience in the field in which they instruct. However, the increasing reliance on such contract lecturers can be seen as a literal realization of Goffman's shattered or "split" (lecturing) self: the animator function of the lecturer is arrogated to one group while functions associated with other (lecturing) selves such as those associated with research, authorship, and reputation are the exclusive domain of a privileged few.
27. In "The Lecture," Goffman reflects on this at some length, saying that in the spoken lecture, footnotes and parenthetical references cue listeners to a "change in footing that in turn implies a facet of self different from the one theretofore projected." Goffman, "The Lecture," 177.
28. McLuhan, *Counterblast,* 12.
29. Gallo, "Public-Speaking Lessons."
30. "Lecturing to Large Groups" is the title of a chapter by Morton in Fry, Ketteridge, and Marshall, *Handbook for Teaching.* The chapter also recommends that lecturers work to:
    - link the lecture to some current news or activity;
    - use relevant and current examples to illustrate the point;
    - draw on the students' experiences;
    - use rhetorical questions to encourage students to keep on track;
    - use live links to the Web to demonstrate currency of the material being presented. (p. 60)

To put this in the language of Fichte and Goffmann, such recommendations are not about the textual self or the dead letters recorded well in advance of the lecture itself. They are instead about the aside and the extemporization, about the illusion of fresh talk or about a kind of fluid rendition of a complete or partial text that someone like Fichte was able to perform.
31. Gallo, "Public-Speaking Lessons."
32. Ibid.

CONCLUSION: **Educations and Generations**

Epigraph: Foucault, "Discourse," 227.
1. Foucault, "Discourse on Language," 227.

2. Kittler, "Afterword," 369.

3. For an exploration of the seminar and defense in post-medieval Europe (especially Germany), see Clark, *Academic Charisma*. For a discussion of the origins of curriculum in the same European context, see Hamilton, *Theory of Schooling.*

4. For more about this change and its implications, see Martin, "Educational Inadequacy,"185–208; also Friesen, "*Bildung*," 100–120.

5. Peters. *Der Vortrag*, 160.

6. Tröhler, "Knowledge of Science," 79.

7. Ibid., 79–80.

8. Ibid., 79.

9. Barton, *Literacy*, 179 (italics in the original). Also, Neil Postman in *Technopoly* notes "a four-hundred year-old truce between the gregariousness and openness fostered by orality and the introspection and isolation fostered by the printed word. Orality stresses group learning, cooperation, and a sense of social responsibility, which is the context within which Thamus [and Socrates] believed proper instruction and real knowledge must be communicated. Print stresses individualized learning, competition, and personal autonomy. Over four centuries, teachers, while emphasizing print, have allowed orality its place in the classroom, and have therefore achieved a kind of pedagogical peace between these two forms of learning, so that what is valuable in each can be maximized" (p. 16). Note that as I have argued in chapters 6 and 8, oral expression and writing (or print) have not been at war with one another, and therefore no truce needs to be established between them. Instead, print and oral expression remain intimately combined and mutually dependent.

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